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Offshore

The Marine Oil OPERATIONS Journal

Oil's Place In The Future World Economy
See Page 42

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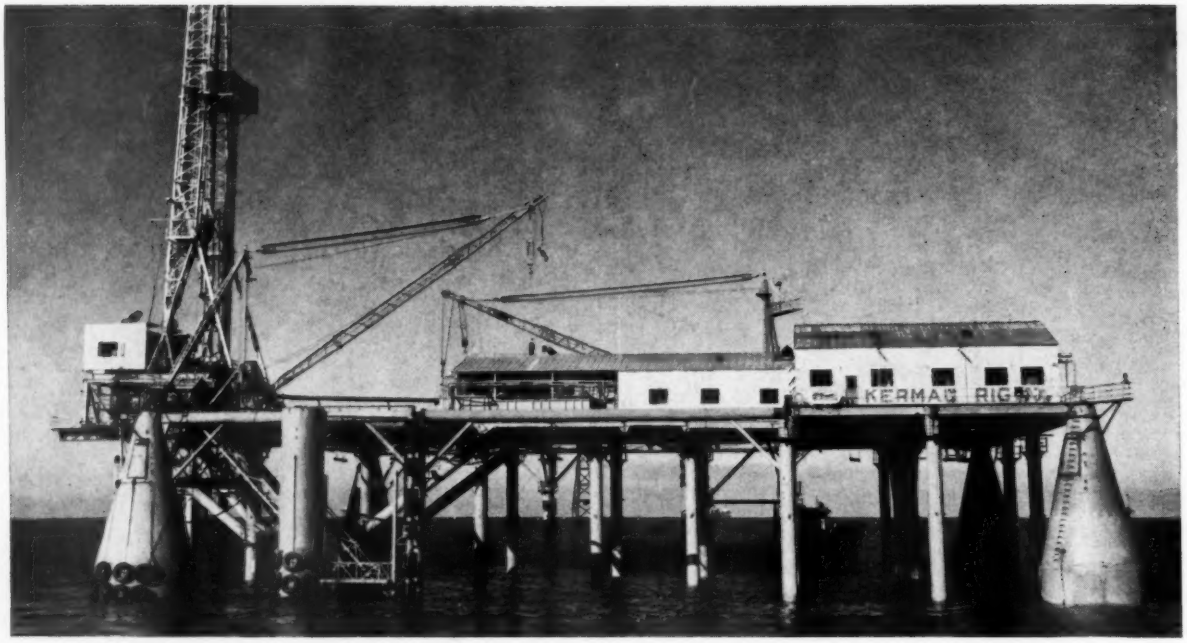


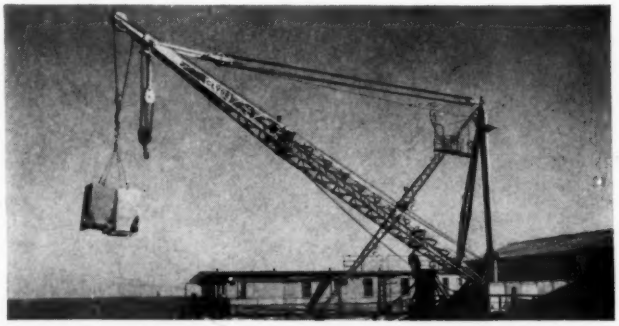
CLYDE DERRICKS and CLYDE HOISTS SERVE ON MASSIVE KERMAC RIG 47

Kerr-McGee Oil Industries, Inc. new Rig No. 47 is pictured above on location for Phillips Petroleum Company. Measuring 202 feet wide by 242 feet long, the new rig offers offshore platform space to spare with a maximum in stability. Built recently at Orange, Texas, Rig 47 was towed in two sections down the Sabine River and assembled at Sabine Pass before outfitting.

Materials handling equipment on this huge drilling rig had to meet tough specifications for reach, capacity and round-the-clock endurance. Two stiff-leg Clyde derricks operating with Clyde electric hoists and swingers proved the answer. These derricks with 100-foot booms are positioned to serve the full area of the giant Texas deck. The hoists are powered by the rig's main diesel generators.

Although the installation and service on drilling rigs are highly specialized, the Clyde equipment that was furnished on Rig 47 is standard equipment. This not only made possible substantial savings in design and construction costs, but also gave the strongest possible assurance of getting performance tested machinery. The all-welded booms and stiff-legs, rigid steel hoist frames and ball bearing shafts are but a few of the many Clyde quality features "right out of the catalog".

If dependable materials handling in any bulk or form is a problem that concerns you, check with Clyde. Find out why Clyde equipment pays *you* best.



CLYDE DERRICK BOOSTS MUD CANS FROM BOAT TO TOPSIDE. With 100-foot booms, the Clyde derrick on No. 47 reaches the extreme non-drilling end of the giant deck. At right, bulk mud cans are being unloaded from Kermac Work Boat III, anchored alongside rig.

For offshore, for ship or shore, Consult Clyde Marine Engineering Department

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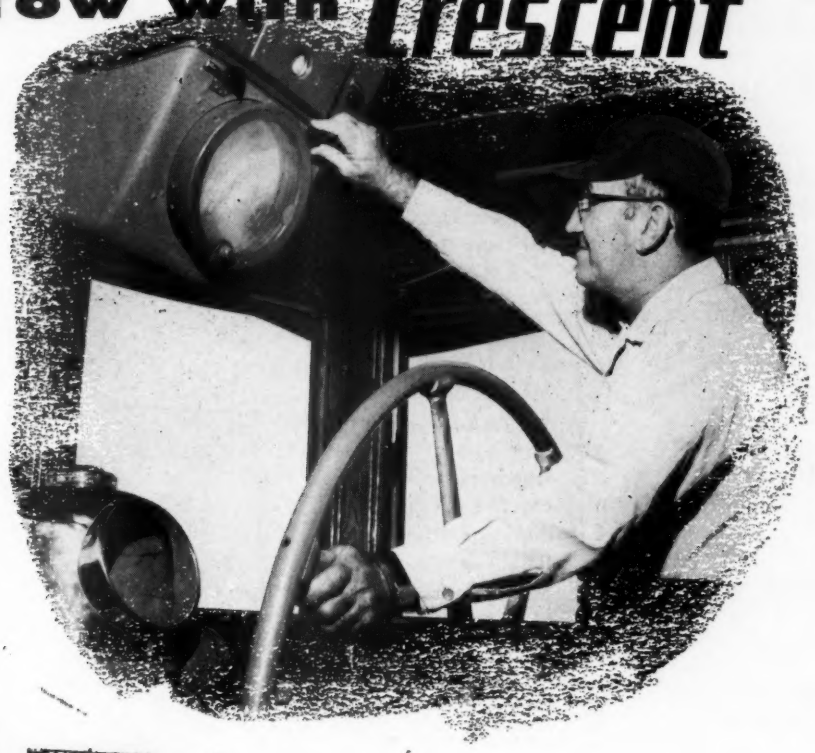

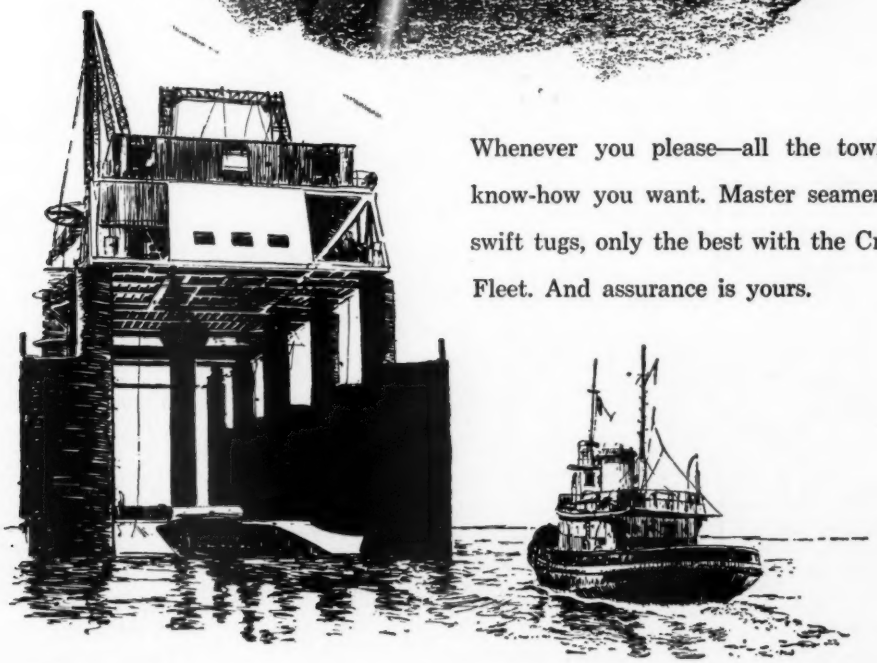

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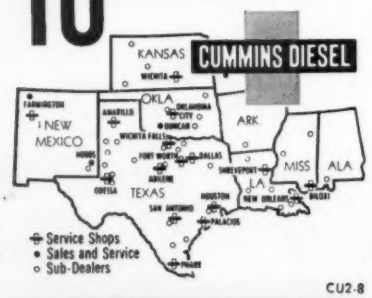

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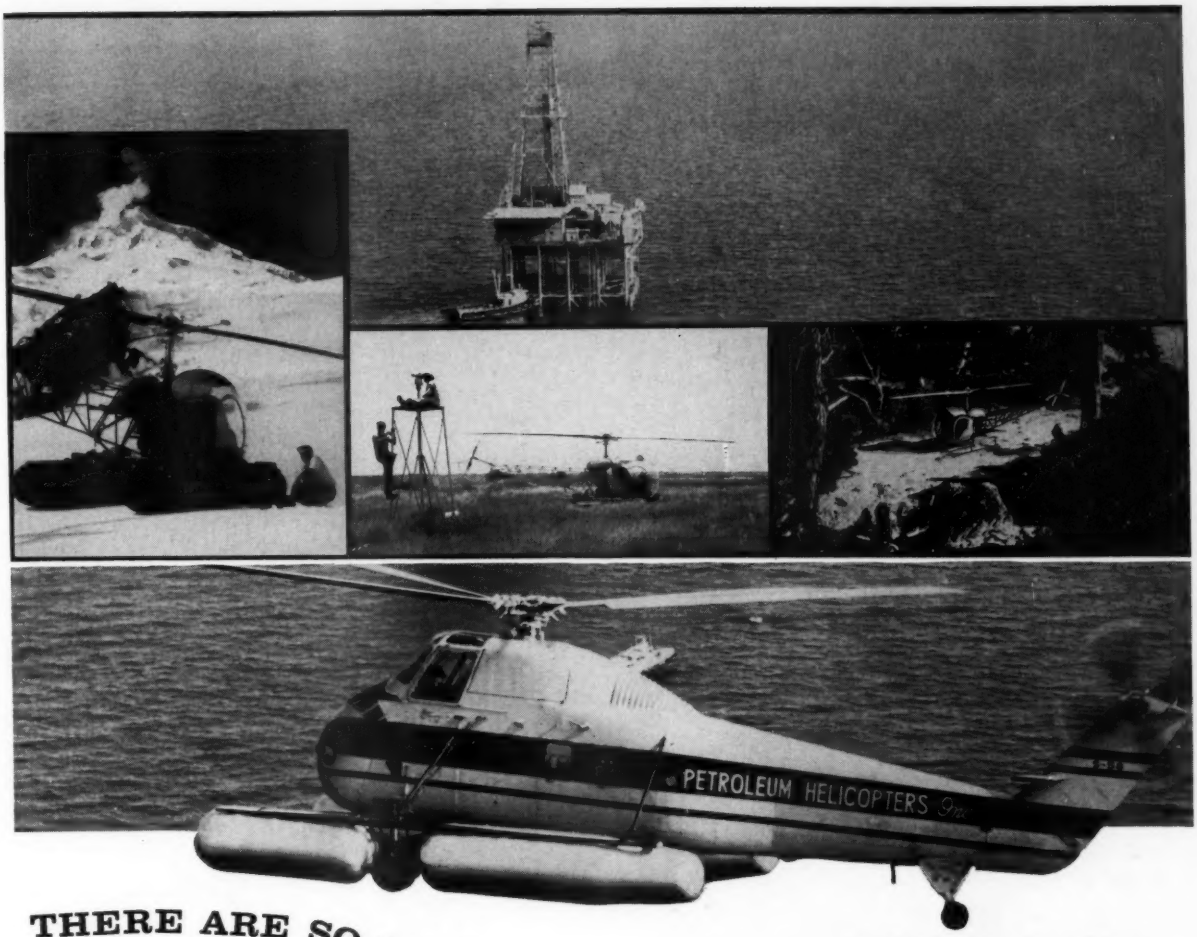

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Way offshore . . .

With the Publisher

AS A TOWHEADED young'un out in West Texas and New Mexico, I was trying to walk bow-legged at the age of seven—like my Uncle Em, who was a cowboy. I also had the notion I could ride anything with four legs and hair, as the old western expression goes, providing my older brothers could get a saddle or circungle on it.

As a result, I've been pitched into fences, feed troughs and water troughs by a variety of yearling bulls, wild burros and green broncs —and have used my freckled nose to root up quite a few cow-chips while they were still fresh.

But I reckon the wildest ride I ever made was on a windmill fan.

A couple of neighbor kids were the cause of it. To show off, I bragged that I could ride the fan on this 100-ft. windmill. Might have made it, too, if I hadn't got my hand caught in the cogwheel and let it chop off one finger and chew up another.

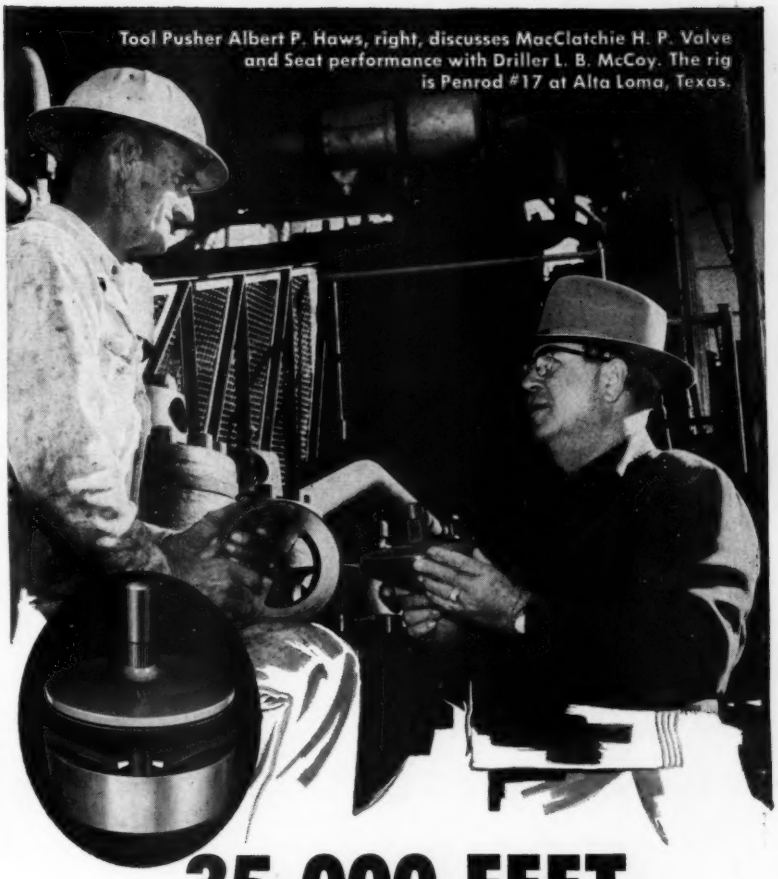
Starting out early like that on a windmill, I've sure pulled my share of sucker rods since. I also drilled some wells—years later—with a little old cable tool rig held together mostly by baling wire and cuss-words. Hit some shallow oil, but it dribbled out. So the only way I finally got into the oil business was backwards—writing about it.

But there are sure some fascinating things to write about. In this issue, for instance, we've covered major drilling developments in the industry over the past year, and some of them are fantastic. Things we never dreamed about back when we were slinging sledge hammers to dress bits, and making our own fishing tools out of pieces of casing cut with a blow torch. Man, we didn't even cement our casing! We just dropped it hard, hoping it'd wedge and cut off the water by force of sheer weight.

But that's getting into the completion field, and we plan to give you the lowdown on that in next issue.

So—see you next month!

Long John Latham



Tool Pusher Albert P. Haws, right, discusses MacClatchie H. P. Valve and Seat performance with Driller L. B. McCoy. The rig is Penrod #17 at Alta Loma, Texas.

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Albert P. Haws, Tool Pusher.

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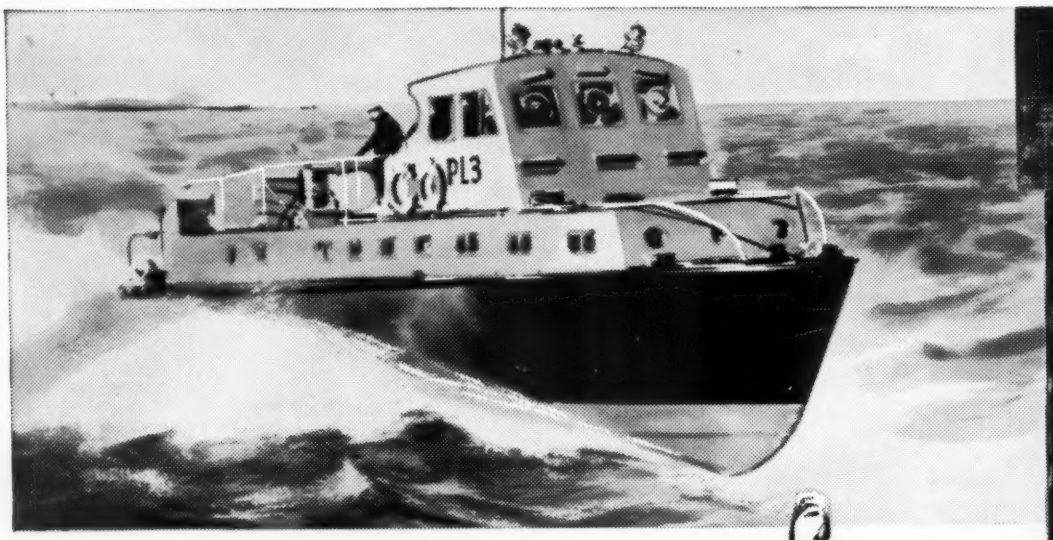

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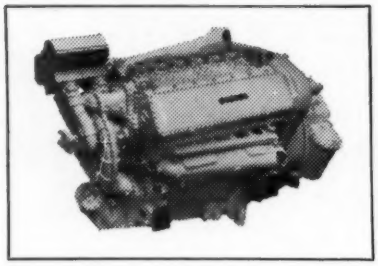

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The boat illustrated is one of the fleet of Thornycroft-built, twin Deltic powered, 50-passenger crew launches operated by the Shell Petroleum Company on Lake Maracaibo. Plans of Deltic powered crew boats suitable for Gulf operation are available.

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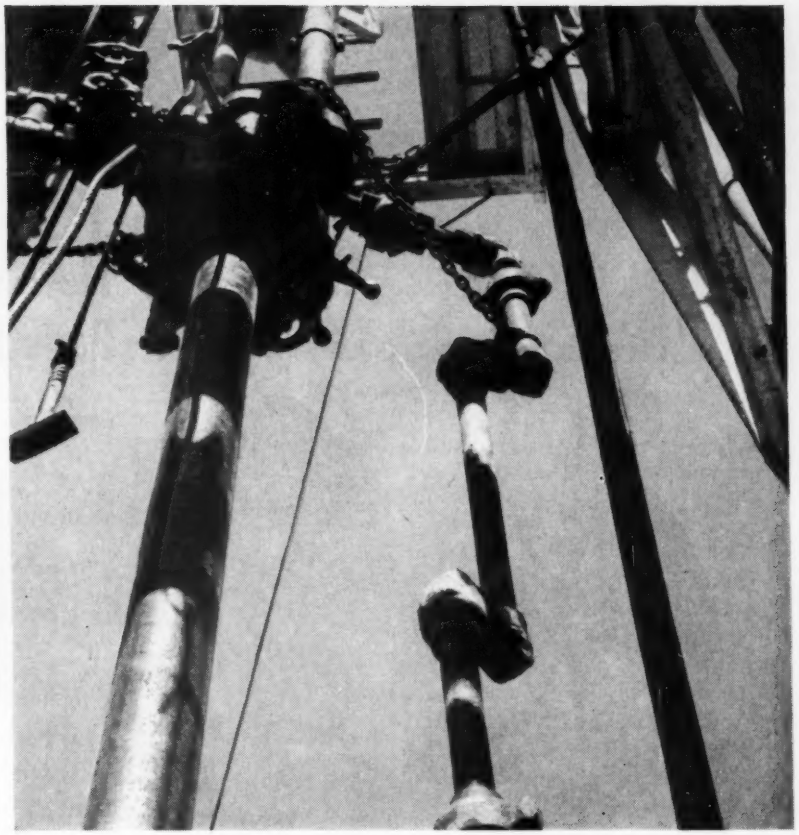

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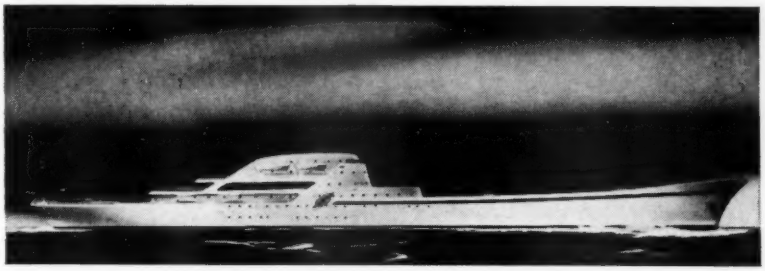


When the world's first nuclear-powered passenger-cargo ship, the Savannah, goes to sea, her fresh water will be supplied by Cleaver-Brooks Flash Evaporators.

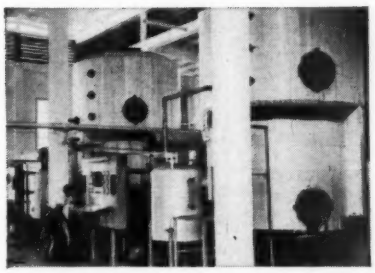
Long operational runs without attention for feed water treatment or interruption for cold shocking plus minimum installed cost are the reasons behind the selection of Flash Evaporators. With the keel already laid, preparation for installing these Cleaver-Brooks evaporators moves ahead.

Widely recognized for having simplified the age-old scaling problem, the Cleaver-Brooks flash evaporators require less auxiliary equipment and less attention than any other type.

Cleaver-Brooks makes a complete line of flash evaporators for shipboard, seaboard and offshore rig use.

And for the Navy . . . Cleaver-Brooks will provide a 280,000-gallon-per-day fresh water plant for its first nuclear-powered aircraft carrier, now under construction at the Newport News Shipbuilding and Drydock Company.

It will be the largest distilling plant of any type ever installed on a sea-going vessel and the largest sea water plant in operation in the United States.



ECUADOR WATER PLANT EXPANSION

Continually plagued by lack of rain and high cost of importing fresh water, the coastal town of Salinas — several years ago — solved its problem of water shortage by installing 100,000 GPD capacity vapor compression sea water distillers. The tremendous local acceptance of distilled water as the potable municipal supply meant an increasing population and greater demand for water.

Now the outstanding vacation spot for Ecuadorians, Salinas is doubling the size of the water plant with the addition of the simple, low cost Cleaver-Brooks flash evaporators. The use of surplus natural gas (available from nearby oil wells) as primary fuel is expected to bring the cost of fresh water well below any previous experience in this area.

Many other coastal municipalities are now studying the situation to determine how their fresh water shortages can be similarly solved to aid population growth and municipal expansion.

GIBRALTAR TO GET ADDITIONAL CLEAVER-BROOKS EVAPORATORS

Under contract with the British Admiralty, Cleaver-Brooks is installing a new 145,000 GPD flash evaporator plant with boilers which will be placed into operation early 1959. While the new Flash plant is for the NATO Base, Cleaver-Brooks is not a newcomer to the "Rock" as the City of Gibralter has been operating a vapor compression distilling plant since 1952.

Of particular interest in this plant are the design restrictions imposed by transportation and road facilities to the final site. With much of the fabrication arranged in England through subcontractors, final assembly must be completed at the ultimate location to stay within transportation weight limitations.

For helpful suggestions that solve your fresh water problems send details to: Dept. 0-108, Cleaver-Brooks Company, Special Products Division, 225 Grand Avenue, Waukesha, Wisconsin.

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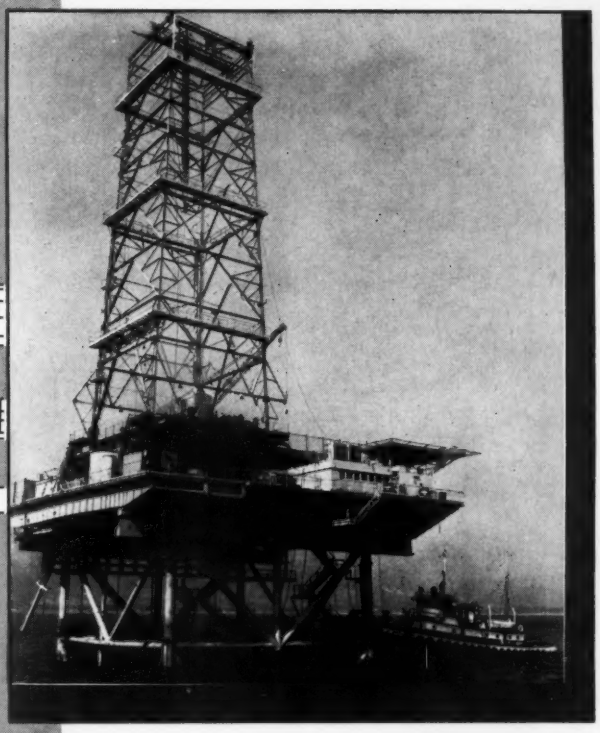

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From crew boats to offshore platforms, Western contractors ASK NASSCO, because NASSCO is the coast's only experienced builder.

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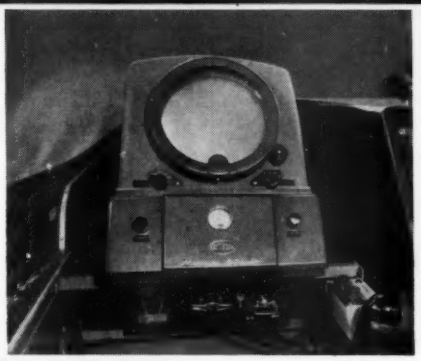
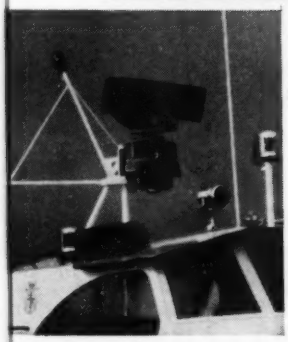
This 51-ft. 24 m.p.h. Equitable crew boat built for Robin Rental, Inc., Harvey, La., is equipped with a Raytheon radar, radiotelephone and depth sounder for reliable navigation and safety.

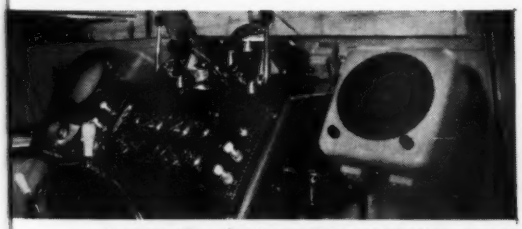




Raytheon Model 1500 radar is compact, yet has a big 10" screen. Accurate, dependable, easy-to-use, it is indispensable in bad weather.

•

Rugged, lightweight radar antenna unit is easily and economically installed.



Workmanlike pilot house includes Raytheon Model 1500 radar (left) and Model DE-116 Fathometer® depth sounder for safe piloting in shoal waters.

Look under Marine Equipment and Supplies In The Yellow Pages

FAST NEW CREW BOAT FLEET FULLY RAYTHEON-EQUIPPED

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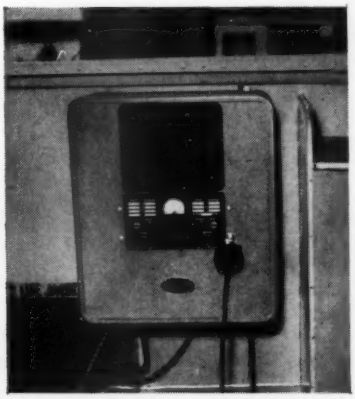
If you are interested in truly dependable marine electronic equipment for offshore operation, see your Raytheon dealer.



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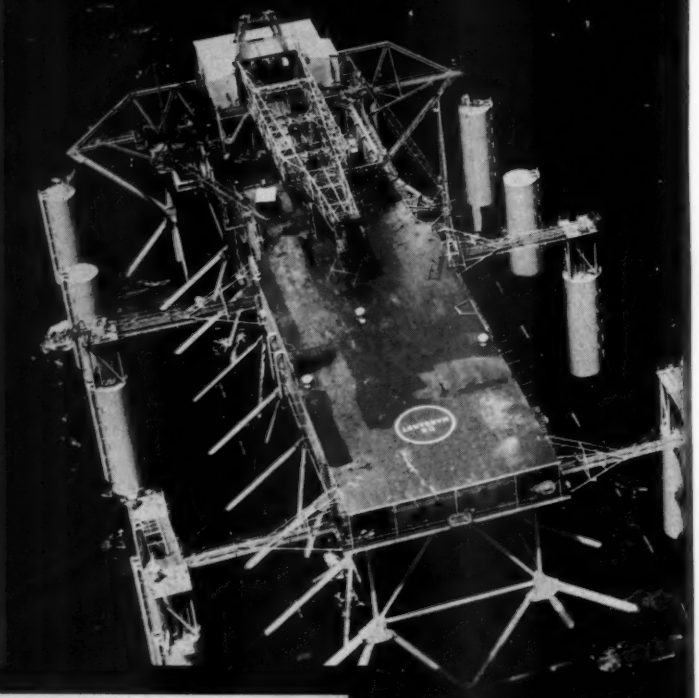

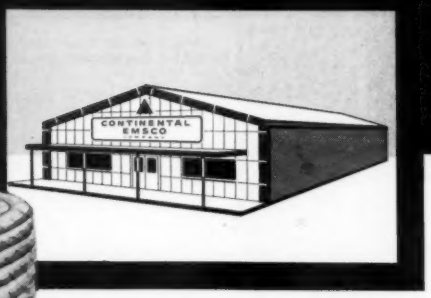

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An exclusive article
Written for OFFSHORE
by O. L. Fisher
Vice President of Continental Oil Co.

O. L. Fisher

What Should Be Done About Offshore Allowables—Now!

- **Offshore allowables have been cut excessively; the average well off Louisiana is allowed to produce only 24 to 37 % of 1953 allowables!**
- **Proper credit should be given for area, depth of water and production hardships**

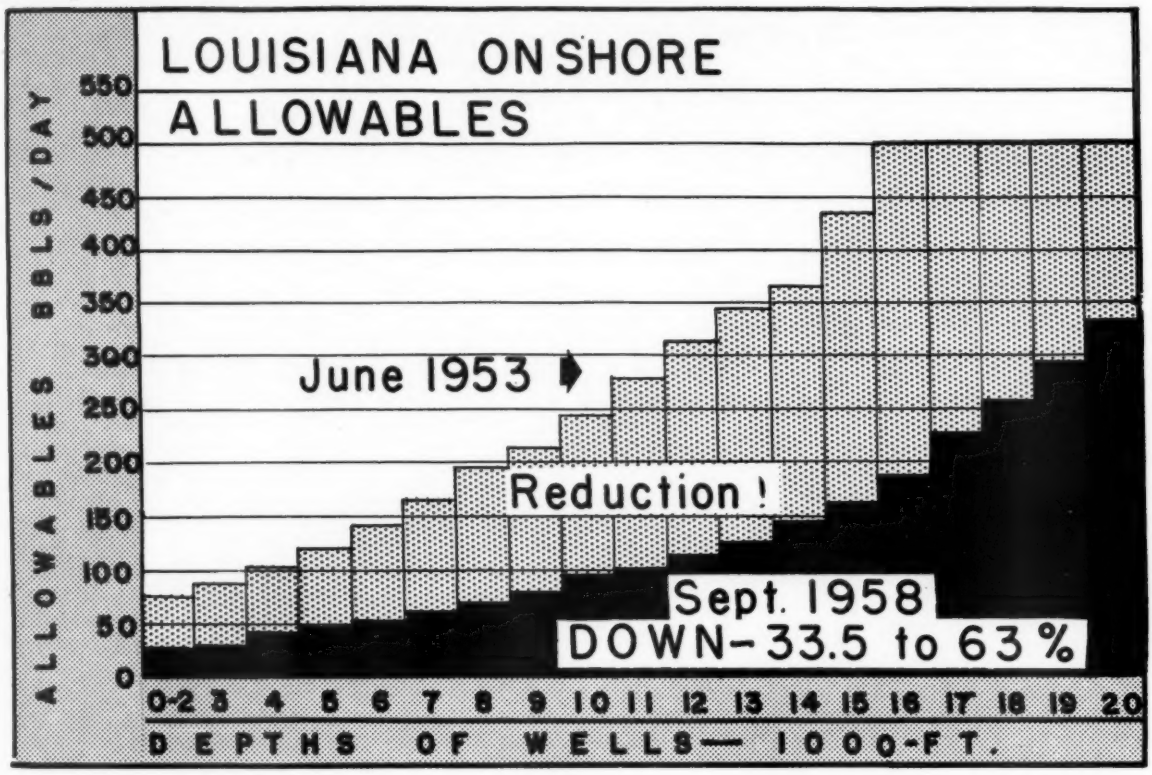
by O. L. FISHER
vice president Continental Oil Company, Houston

Offshore Louisiana, one of the last remaining domestic oil frontiers, has suffered a more drastic curtailment of activity than any other area in the United States. The almost insurmountable obstacles of wind, waves, water depths and distances from shore in the offshore area of Louisiana have been overcome, only to have production rigorously reduced by continuous cuts in allowables.

Operators, with a fairly accurate idea of the costs incident to drilling and operating facilities, entered the offshore area characterized by an unstable sea

(continued on next page)

compare this . . .



Offshore Allowables . . .

(Continued from preceding page)

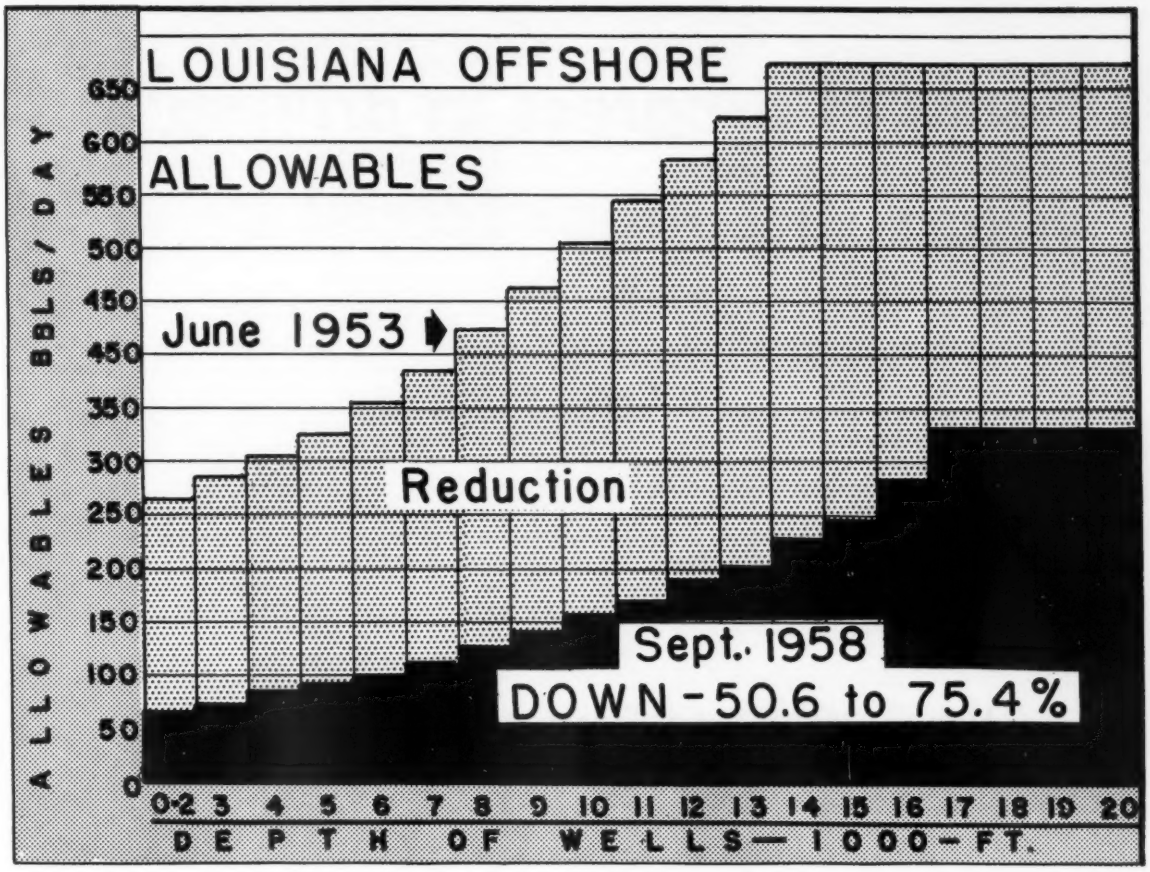
floor and even less stable weather. Encouraged by the quality of the structures and the highly successful history of production from the adjacent South Louisiana onshore area, tremendous investments were made in lease bonuses, shore bases, drilling and producing equipment, and operations, and approximately 9,000 men were directly employed in offshore oil and gas operations. Additional encouragement came from the policies of the state regulatory authorities which recognized the economics of offshore oil and gas development. In April of 1950 justification for this encouragement came in the form of State-wide order No. 151, an allowable order recognizing that additional production for wells in the Gulf of Mexico would be necessary if the offshore venture were to live in an economic climate comparable to onshore.

Except for periods during which the State-Federal boundary controversy caused cessation, drilling activity continued its ascending rate. In July, 1957, 119 rigs were operating in the Gulf. Industry was spending an estimated 22 million dollars monthly—more than double the estimated gross income. The discovery rate was exceptional with more than one of each four exploratory wells being successfully completed, compared with a one in nine for the continental United States. The explorers' faith in the new frontier was amply justified and 2,000 wells were drilled in the 90 fields discovered by the close of 1957.

The entire economy of the Louisiana Gulf Coast area reflected the stepped up activities. The assessed valuation of the eight coastal parishes increased 125 percent between 1946 and 1956, from $146,185,313 to $328,030,568. Sales tax collections increased 500 percent between 1947 and 1956, from $1,469,808 to $8,785,617. Population showed a 50 percent increase from 1950 to 1957, from 293,757 to 440,635. Also, with the assistance of offshore drilling, Louisiana continued to show increases in reserves when other states in the Southwest were showing decreases.

Demand for crude from Louisiana has failed to keep up with the total increased production capacity, with the consequence that allowables, established on a well basis, had to be reduced. In 1957 the relationship between the on and offshore per well allowables was changed so that the wells in the offshore area bore the brunt of the reduction. For example, allowables for onshore wells in June of 1957 were 47.7 percent of the June 1953 allowables for all depth brackets from 0 to 16,000 feet, while allowables for offshore wells in June of 1957 ranged from 30.9 percent to 42.5 percent of the June 1953 allowables over the various depth brackets from 0 to 16,000 feet. Faced with this allowable reduction, and very little reduction in costs, operators offshore have cut their activities sharply. By the middle of July 1958 there were 60 percent fewer drilling rigs

. . . with this!



operating in the Louisiana offshore area than one year earlier. The reduction in drilling rigs onshore Louisiana has only been 19 percent. It is estimated that the annual rate of expenditure in South Louisiana, directly incident to offshore activities, has been reduced $260,000,000 since the middle of 1957. Investment in idle drilling equipment exceeds $60,000,000. No effort has been made to estimate the effects on activities related to drilling, such as, the effect on service and supply companies. It is apparent that when the economy of an area has been dealt a blow of this magnitude, it is essential that corrective action be taken promptly.

The problem of what form the corrective action should take has received much attention from the State regulatory group and from the operators. The fundamental **weakness of the present allocation plan is the emphasis on the well as the main unit** on which distribution of the State allowable is made. To reduce the tendency toward overdrilling the reservoir to secure additional allowable, the **emphasis must be switched to give credit for acreage developed and the quality of the reservoir. A more accurate redetermination of the proper relationship between onshore and offshore economics must be given recognition** in the allocation to fields in the offshore area. It will be necessary to permit **more flexibility for making up allowable production curtailed because of weather, transportation problems, delays** of completion permits and other adverse operating conditions.

The offshore operator can take encouragement from the fact that a conservation statute exists which permits the adjustment of allocation to give credit to those factors that support a higher rate of production from offshore fields and from the recognition by the state regulatory authorities of the seriousness of the problem.

It is essential that regulations be effected which promote and encourage exploration and orderly development drilling in Louisiana and offshore Louisiana. The public interest will be served and the State's economy improved by the adoption of a program that will restore the economic feasibility of offshore drilling. The following specific factors should be considered: (1) The establishment of allowable zones based on the economics of drilling and producing (a) onshore, and (b) offshore by water depths, (2) The establishment of offshore pool allowables, (3) Freedom to make up back allowables offshore resulting from adverse weather and other operating conditions, (4) Retroactive allowables onshore and offshore to date of actual completion, and (5) As an interim measure the immediate return to the original relationship of offshore and onshore allowables.

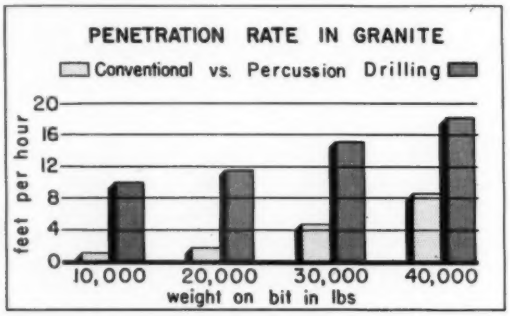
Years of progress in drilling Brings these new ideas!

By **DON TAYLOR,** Editorial Consultant, and
TOM SNEED, Editor

THE OIL industry has ups and downs—we've had 10c oil and we've had the high level production of the Suez crisis. When the present recession came, many oil operators and suppliers elected to re-trench and wait out the rough weather. Others used this period as an opportunity to move out ahead by devoting money and effort in developing new ideas and methods that would solve the problem by reducing the costs of finding and developing oil and gas reserves.

Many of the new ideas listed below have come as a direct result of "tough" times; others have come as a normal result of research started years ago. But each of these new ideas (some of them are simply new applications of old ideas) will bring lower costs, or higher efficiency to the U. S. oil industry that has withstood the inroads of imports.

Four "New" Ways to Drill a Hole

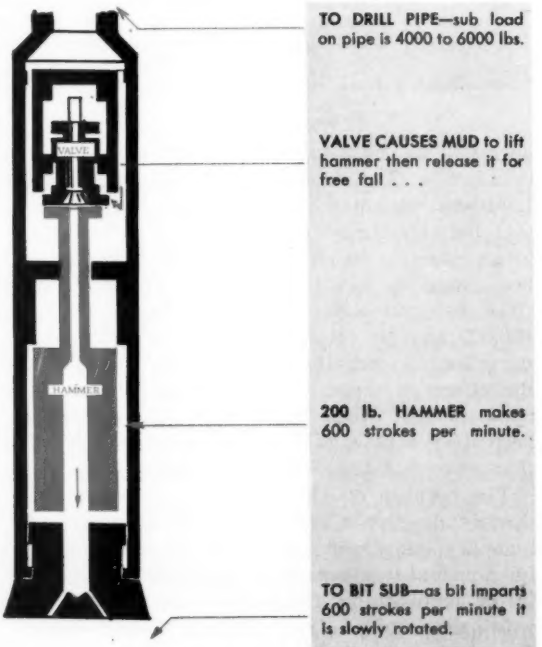


1. Percussion drill rated 25 to 400% faster

OUT OF GULF'S RESEARCH LABORATORY comes one of the most important new ideas of the past 12 months. It is a new percussion drill that works like a jackhammer when actuated by the mud circulating down the drill pipe. Its penetration rates are 25 to 400 percent faster than conventional equipment. Moreover the bit life is extended 50 to 500 percent longer than normal. Here is the way Gulf Oil Company's new drill works:

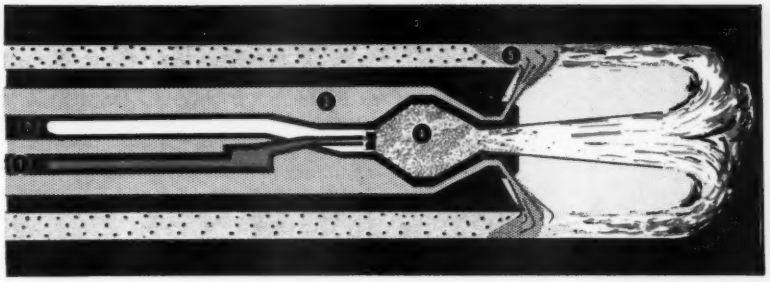
A mud powered jackhammer-type cylinder causes percussion blows to strike a slowly revolving conventional bit. A 200 lb. hammer delivers 600 or more strokes a minute to chop verticle hole despite hard or slanting formations.

The percussion drill is simply constructed with only a cylinder, a hammer and a valve. It will run 60 to 100 hours without servicing. When needed, percussion head can be repaired quickly on the rig floor, so simple is its construction.

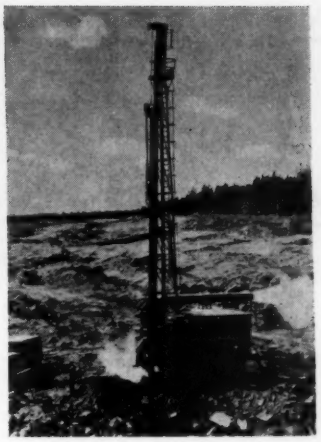

TO DRILL PIPE—sub load on pipe is 4000 to 6000 lbs.
VALVE CAUSES MUD to lift hammer then release it for free fall . . .
VALVE
HAMMER
200 lb. HAMMER makes 600 strokes per minute.
TO BIT SUB—as bit imparts 600 strokes per minute it is slowly rotated.

In use, the bit points are successively positioned and driven against the hole bottom, and the bearings are subjected to little wear.

Tested in 32 different holes in West and East Texas, Oklahoma, Nevada and Canada, the new drilling tool has proved to be an effective drilling cost reducer.



1. FUEL INLET
2. OXYGEN INLET
3. COOLING WATER
4. COMBUSTION CHAMBER
5. WATER SPRAY



2. Burn a hole?

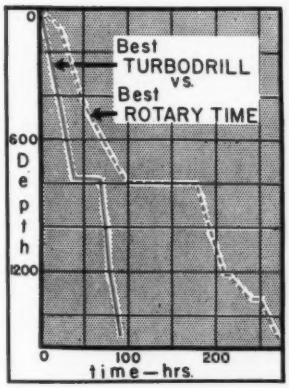
COULD BE. The drilling tool at the left is in widespread use in the quarry and mining industry. In fact, it is used to pierce 9-in. 50-100 ft. deep holes in granite, taconite, quartsite and sandstone. Rate of penetration in granite runs about 20 to 25 ft. per hour.

The new rock drilling unit uses kerosine as a fuel with oxygen and water. The kerosine and oxygen mix to form a high velocity flame (about 600 to 700 fps) which blasts against the hard rock causing it to spall off. As the hot gases start up the hole they are quinched by a water jet and the steam that is formed supplies sufficient volume and energy to lift the cuttings to the surface. No one has yet tried this method on deep holes, however it does afford interesting speculation.

3. Turbodrill whomps down eight 17½-in. holes 1440'

A 17½-IN. TURBODRILL made a fair amount of hay in the oil patch recently when it made its first commercial debut, drilling eight 17½-in. 1440-ft. deep holes through tough surface rock lying atop the Herscher Dome, 52 miles southeast of Chicago, Ill.

Moran Bros. Drilling Co., contractor, resorted to turbodrilling because there was not enough depth to mass sufficient drill collars in the hole to handle the hard surface rock. But the turbodrill made fast work of the problem, turning the bit at the rate of 600 to 800 rpm's and delivering 100 hp at the bit, for a record 300 percent better penetration rate than conventional rotary.

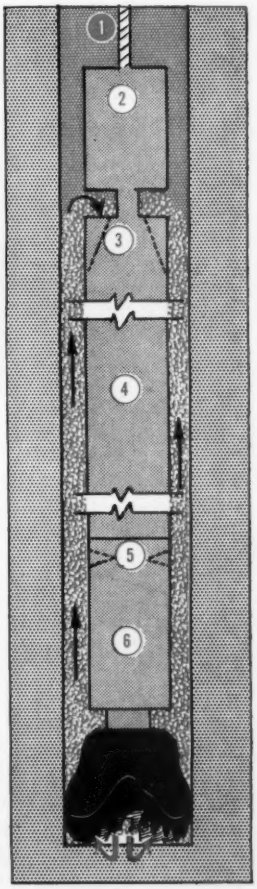


4. Russia's Electric Drill

AN ELECTRIC WIRE-LINE DRILL was recently reported by Russia. Its purpose is to reduce initial investment in drilling equipment and increase deep penetration rates. Success of the unit, has been limited, yet its possibilities are exciting.

The drawing at the right shows its main parts. Note the long bailer integrally mounted above the electric pump. As the unit operates, mud circulates out the eyes of the bit and up to the top of the bailer and back down. As mud enters the bailer, cuttings are filtered out, and then the unit is pulled to surface and dumped.

The unit is suspended from an electric swivel by a copper core cable that supplies power to the motors. At the surface there is a light derrick, drive and control equipment and a settling pit for the cuttings.



1. COPPER CORE hoisting cable is 1¼-in. wire rope.
2. ELECTRIC SWIVEL and threadless detaching device.
3. BAILER FOR retention of cuttings.
4. MUD DISCHARGE, flow relay and 500 volt—300 rpm electric motor.
5. TWO-STAGE centrifugal pump circulates mud at the rate of 2¼ gal. a second.
6. REDUCTION GEAR drives bit at 500 to 600 rpm.

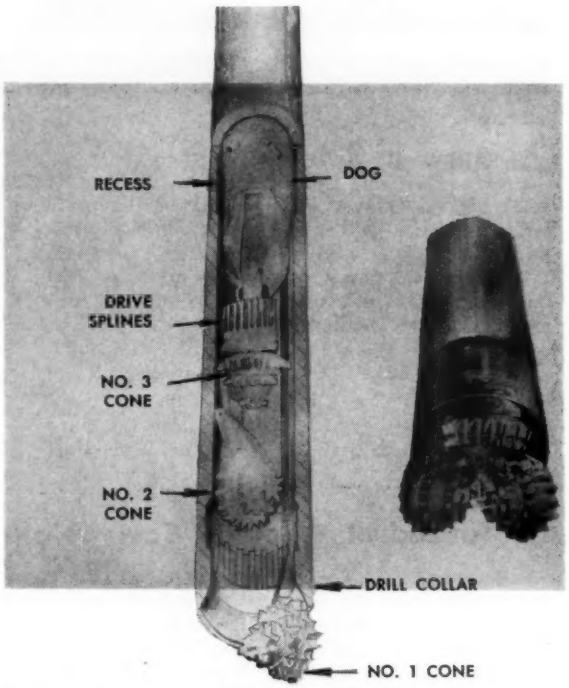
Hoisting cable comes in 6890-ft. lengths weighing about seven tons but capable of supporting 30 tons. Weight of the entire unit including surface equipment is only 16 to 18 tons. In a series of tests the electrodrill penetrated from 7 ft. to 55¾-ft. per hr. The bit is reversed from time to time to keep the shell from spinning. This reversal takes only a fraction of a second.

What's New in Bits

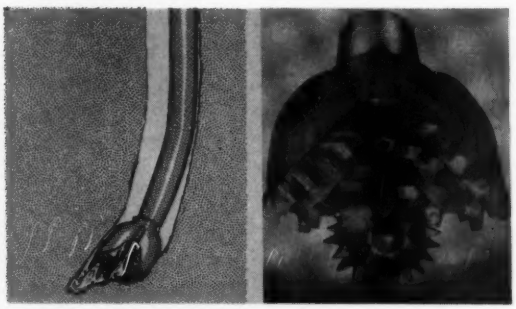
5. Retractable bit Eliminates trips. Licensed to Hughes

ATTACH BIT to the top of a casing string, drill-in the casing, retract the bit and set the casing. This is the technique used by Carter Oil Company to effect a 25% saving in shallow well (7500-ft.) drilling.

This retractable bit developed by Carter Oil Company, has now been licensed to Hughes Tool Co. Though original bits tested by Carter gave only 55 to 90 percent of conventional bit performance, new perfected bits are expected to give 100 percent performance or better. Even with reduced bit life, this drilling method is a triple saver. Bits pass in a collapsed position through the casing, snap out to drilling position to cut a hole large enough for the casing to pass through. When bit wears out it is simply retracted, pulled up by the sandline and changed. Because round trips are eliminated, one less man is needed on the derrick floor. Investment in drawworks and derrick is reduced because both can be smaller and lighter.



6. Deviating bit eliminates whipstock-in soft formations



TESTED IN 100 WELLS, this new bit washes slant hole 3-9 degrees off center in soft Louisiana onshore and offshore formations.

Bits used for this form of jet deviating were developed by the California Company and Hughes Tool Company. Test bits have been adaptations of the conventional Hughes OSC-4J bit. Two ⅜-in. jets and a ¾-in. jet are mounted in the bit. The ¾-in. jet will deliver twice the mud volume of the other two jets combined. As long as the drill string is turning the bit jets the hole evenly. If the bit is stopped and locked in one position, the oversized jet starts cutting hole to one side. Gentle spudding of the drill string increases the deviation and drilling rate. When the desired degree of deviation has been reached, rotary is started again and drilling continued normally.

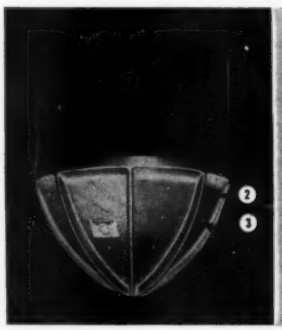
Use of this hole deviating method eliminates the four or five round-trips needed to run a whipstock, reamer and limber and stiff hook-ups for drilling in whipstock holes.

The deviating bit takes no special equipment, difficult techniques or extra down-hole tools.

7. Expendable spud-shoe for offshore

JET GUIDE SHOE was developed by Rector Well Equipment Company for setting offshore conductor pipe and spudding in foundation piling for offshore platforms.

The shoe is butt welded to the conductor casing and salt water jetted at 400 psi, through the holes in the aluminum nose, washes the 30-in. shoe and conductor casing down through the overburden at the rate of up to 125 ft. an hour.



1. GUIDE SHOE is available in any size.
2. REINFORCING RIBS give added strength to aluminum shoe.
3. PARALLEL PORTS allow jetting in of conductor casing.

8. A 1500 hp plunger pump proving successful

A RADICALLY NEW light weight, V-type mud pump has been developed by Cardwell Manufacturing Company. Reportedly, the 1500 hp pump has been tested successfully on four wells.

Pump is 7-ft. long, 8-ft. wide and 6½-ft. high and weighs 23,000 lbs.—only 15 lbs. per hp compared to 50 lbs. per hp in conventional pumps.

Pressures from 2000 to 4500 psi and volumes of 626 to 1114 gpm can be obtained with the pump. Pump operates at 260 strokes per minute, utilizing interchangeable plungers to vary volume and pressure.

Cylinder arrangement in the V-1500 mud pump is similar to a V-type automobile engine.

Plunger design of the new pump eliminates pistons and fluid liners commonly associated with mud pumps. Units smaller than the 1500 hp model are presently under development.

Air and Gas Drilling—Stopping Water Flows

9. Dual systems—mud and air

TESTS IN HARD ROCK COUNTRY are proving that air and gas drilling is coming of age. Faster penetration rates and fewer bits used sometimes make it economical to use air and gas even where it is necessary to equip the drilling rig with both an air and a mud system.

A dual-purpose rig can use foaming agents when weeping or slow seeping formations are encountered, and when water sands are drilled, convert to mud for squeezing.

Several new formation blocking materials have been developed to block out the water producing formations. One is a low-viscosity liquid that sets up as a stiff gel; another material for deeper zones and higher pressures is a liquid resin which has a low viscosity to allow formation penetration, then sets up to a hard plastic capable of withstanding high water pressures.

Still another new material is a slurry which is placed as a liquid, squeezed into the formation and allowed to set. It is not as strong as liquid resin but costs less.

Sometimes it is economical to load and unload the hole with mud in order to drill as often as possible with air. An increase as high as 500 percent in bit footage and a decrease as much as 400 percent in drilling time have been effected with air and gas drilling.

10. Foam controls weeping formations

ONE OF THE CHIEF OBSTACLES to air and gas drilling has been weeping formations—formations that produce from 1 to 40 barrels of water an hour. In air and gas drilling, they make cuttings stickey and often ball up the bit. To combat this, operators can now inject lime water and foaming agents into the well. These mix with the formation water to produce a light, non-corrosive foam that will carry the cuttings out of the hole.

This foam reduces the effectiveness of air drilling, but performance is still 60 percent above conventional mud drilling. As techniques in use of foam and the foaming agents themselves are improved, greater time and bit savings can be expected.

11. Fluid Grout used experimentally in wells

SINCE AIR AND GAS DRILLING IS SO NEW, there is a great deal of experimentation being carried on in many fields. Many different types of fluid grout have been used to block formation water flow. Chief characteristics needed in a grouting solution are low viscosity (preferably that of water); a controllable setting rate; an ability to resist the water formation pressure and stand up to the beating of the drill pipe; and yet be economical. Cement slurries, lost circulation additives in a setting mud and several other bulk sealers have been tried, with fair to good success.

Availability and expense generally determines the advantage of one grout over the other.

12. Liquid gel and resin

POLYMERIC WATER GEL is the third method of blocking out formation water flows too large to handle with foam. This gel has near-water viscosity and retains this viscosity until it starts to set. It has excellent pumping and penetration qualities retaining its fluid state for an easily controlable time. Maximum stiffness can be obtained within 15 minutes after the solution starts to set, greatly reducing rig time required for full treatment.

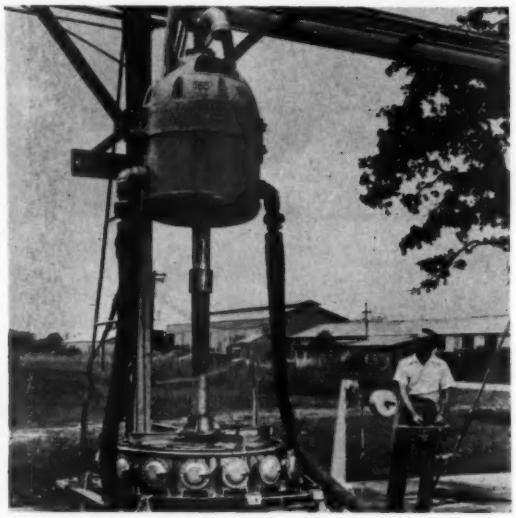
In its extremely fluid state the polymeric gel penetrates the formation deeply, thus after setting it has sufficient strength to hold back considerable pressure. The set is generally unaffected by diluting formation waters.

A difficulty might arise in that one form of the gel is not water or oil solvent and if not selec-

tively set, might block the porosity of a producing formation.

For deeper zones and higher pressures, a liquid resin can be used. The resin has a low viscosity to allow formation penetration. In a predetermined time, it will set up to a hard plastic capable of withstanding rough treatment. Chief drawback of this blocking system is its expense and availability of the liquid resin. But with increased experimentation and wider use this situation will improve.

13. Power swivel now in use



A NEW POWER SWIVEL has been developed by Baash-Ross Division of Joy Manufacturing Company that will speed drilling by reducing the amount of time it takes to make a connection.

This swivel eliminates the conventional drilling swivel, the Kelly, Kelly-drive bushing and rotary table. It makes up on the top joint of drill pipe and rotates it hydraulically, electrically or pneumatically.

The drill pipe can be rotated while tripping in or out of the hole. Connections can be made every 60 ft. or 90 ft. stand.

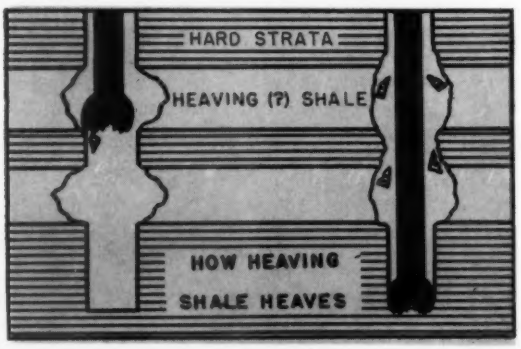
Gulf Oil Corporation used a variation of the power swivel, a power sub, to drill 7711 ft. of hole in 98 hours in Block 154, Ship Shoal Area, offshore from Louisiana. Gulf's test sub developed up to 14,000 ft.-lb. of torque and rotated the drill stem at 140 rpm.

Baash-Ross has produced units up to 160 hp. Swivels larger than 160 hp are still in the development stage. Units as large as 600 hp are being considered.

Both the power sub and power swivel developed thus far have been hydraulically driven. Other units under development may be powered either electrically or pneumatically.

Swivels now under development will be capable of drilling to depths equal to those of present rotary equipment and torque and speed transmitted to drill pipe can also be equaled.

Improvements in Muds



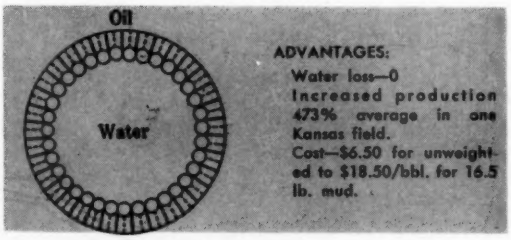
14. New mud additive controls heaving shale, *period*

A CALCIUM SILICATE MUD FILTRATE that will solidify incompetent (heaving) shales and give them both a chemical and mechanical stability was developed by the research department of The Texas Company. Research showed that the brittle shales that break off and stick drill pipe in heaving shale formations are not actually the primary source of trouble. The real culprit is the self-dispersing shale lying between the layers of brittle shale.

When ordinary mud comes in contact with these shales, they absorb water, soften, and disperse in a colloidal state, leaving large cavities below the layers of brittle shale. The latter collapses, falls in the hole and often sticks the drill pipe.

When the new type high pH, high calcium mud filtrate is used, the self dispersing shale undergoes a progressive solidification which eventually renders them as hard and flinty in character as compact normal shale. A number of wells have been drilled to 16,000 ft. with this mud, some of them through shales that have heretofore been inpenetrable with normal limed mud systems.

15. Inverted emulsion mud is paying off



IN ONE SOUTH LOUISIANA WELL Shell Oil Company saved $39,000 by using inverted emulsion mud on a particularly troublesome 2918-ft.

section of the hole. Southwest Potash Company of Denver, Colorado, saved from $11,000 to $19,000 a well on four core tests drilled in Saskatchewan, Canada.

These are typical of the savings when inverted emulsion muds are used in drilling through formations containing water soluable salts along with sloughing sand or shale.

Inverted emulsion mud is made up of blended water, oil, emulsifier and conventional weighing materials. The emulsifier holds the water droplets in suspension in the oil; thus water loss is zero.

16. Gulf's new lubricating mud extends bit life

DOUBLE BIT LIFE is the result promised by a new lubricating mud additive developed by Gulf Oil Corporation. The new additive is economical and can be mixed with any mud.

This new E. P. additive lubricates the bit bearings giving bits 2 to 5 times longer life and cutting roundtrips by the same amount. E. P. also lubricates the casing and the hole itself making roundtrips, casing setting, washover and fishing operations easier. Torque on the drill pipe is also reduced 1/20 resulting in a power savings.

Before the mud was licensed to manufacturers, Gulf ran over 3600 tests on a special testing machine; performed extensive laboratory controlled drilling tests and a number of field tests in West Texas.

17. High temperature mud

NEW CALCIUM AND SODIUM surfactant drilling muds are now being used to combat temperature problems in locations where bottom hole temperatures range up above 400° F.

Conventional water base muds at high temperatures undergo a degradation of additives and a chemical reaction between additives and silicate minerals in the drilling fluid. The result of these changes is a decreased fluid state of the mud and eventually a high-temperature solidification.

Lost circulation and the need for extensive mud conditioning after trips caused by this solidification adds up to long periods of lost rig time.

New calcium and sodium surfactant drilling muds overcome these high-temperature problems by retaining their fluid state, remaining stable under high temperatures and by having a non-dispersing tendency on cuttings.

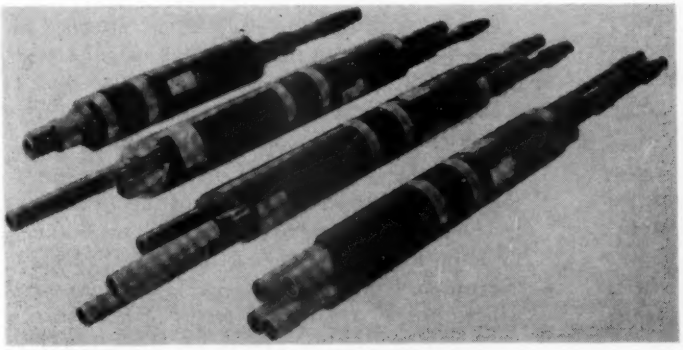
18. Lost circulation additive

A MIXTURE OF ATTAPULGATE CLAY, barite and lost-circulation material has proven to be a quick economical squeezing material for formation ruptures in deep wells in south Louisiana.

This material is no more costly than regular mud and can be applied with a bradenhead squeeze easily and quickly. Mixture can be mixed and placed in the well through the regular mud system. It requires only 12 hours setting time and effectively seals off thief zones with a hard plug.

Because of its flexibility this type squeeze can be used in larger amounts than most other types, and is especially adapted to deep-well formation fractures caused by drilling with 16-18 lb. per gal. mud.

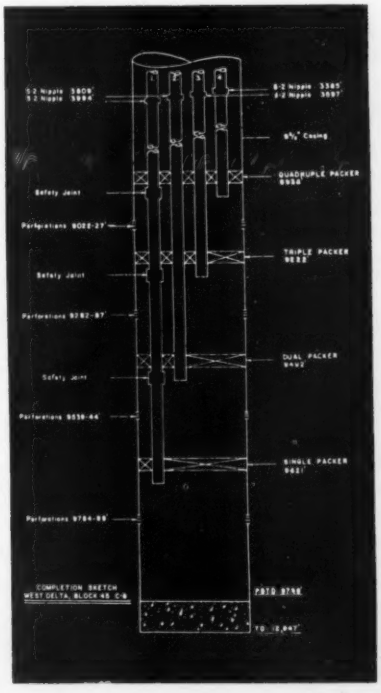
Quadruple completion



19. Four string completion features new packer

WORLD'S FIRST four string completion was accomplished recently by the CATC Group in West Delta Block 45 offshore from Louisiana. This is the latest step in a continuing trend toward more and more multiple completions for greater economy in production.

Packers for this quadruple string completion were designed and built by Brown Oil Tool Company. Packers are the hydraulic-type set individually by sealing off each respective tubing string



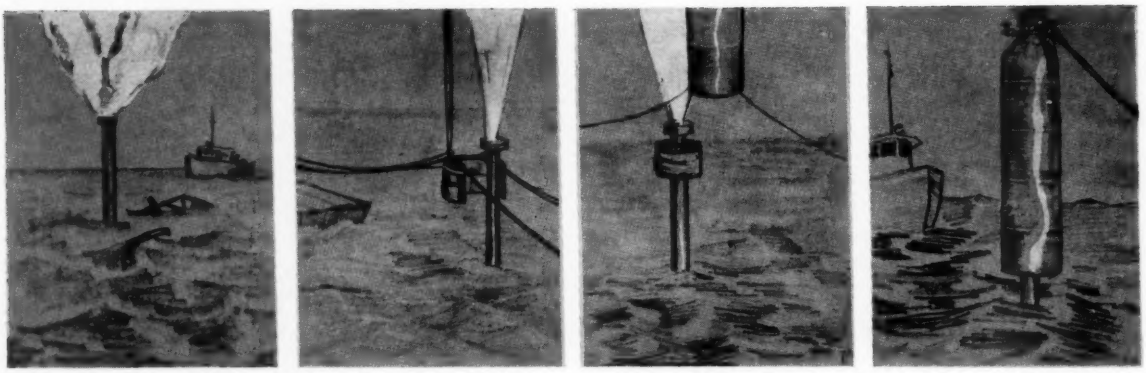
DETAILS OF PACKER setting including location of perforations and packers for each zone in CATC's four string completion.

with a bakelite ball and applying pressure to the tubing. Differential pressures in excess of 4000 psi shears the pins, sets the slip, and collapses the sealing element. (See ad page 34)

20. Four-way tree used on quadruple completion

QUADRUPLE COMPLETION TREE was made up of three solid forged special—alloy—steel blocks made by Cameron Iron Works of Houston. One block contained the tubing head spool, one the four master valves, and one the four tree valves. Integral design of the tree eliminated cross trees.

Blowout control



21. Carters "overshot" blowout control method

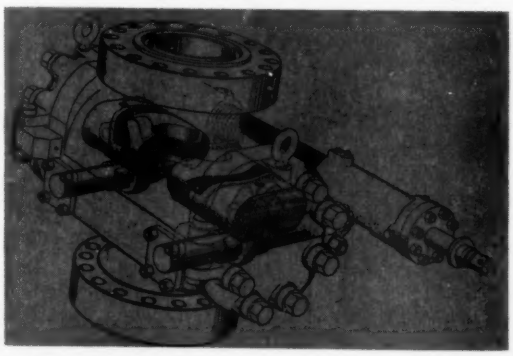
A 14-TON WELL SNUFFER has been developed for controlling blowouts both onshore and offshore. Original idea came from Creole Petroleum Company; Carter Oil Company researched it and the actual equipment was manufactured and tested by the McEvoy Company.

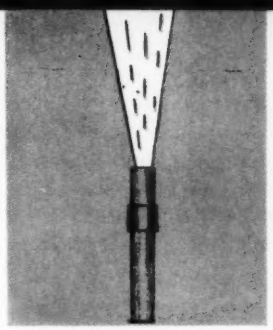
In use, a heavy-wrap around sealing device is attached to the top of the casing of a blowing well, similar to the way elevators are attached to oil well casing. Then the 14-ton caisson is lowered onto the wrap-around sealer and locked into a series of dogs. Valves on top of the caisson are then closed and the well is under control.

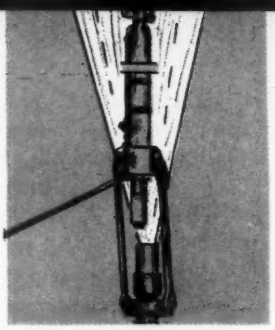
The lifting action of the blowing well against the caisson is opposed by a set of slips forcing a heavy hycar seal to expand against the surface pipe and the inside of the caisson, thus the higher the pressure the tighter the seal. Resulting seal will withstand pressures in excess of 5000 psi.

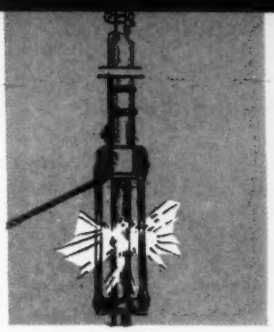
22. Low pressure operates high pressure BOP

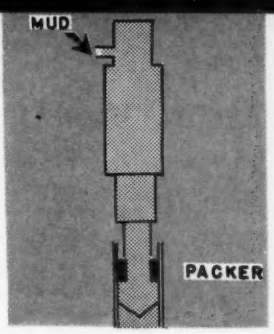
OPERATION OF A NEW BLOWOUT PREVENTER manufactured by Cameron Iron Works is not affected by well pressure. Transverse ram shafts are balanced and pressure sealed at both ends requiring no more pressure to operate loaded than unloaded. Hydraulic operator is attached to one side only. One locking screw is necessary for manual closure in an emergency.











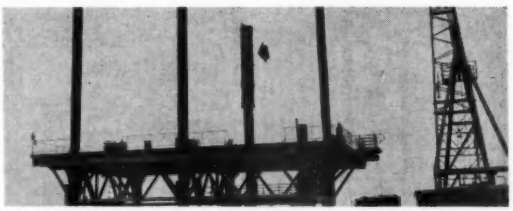
23. Carter's "hydraulic spear" method

A STINGER BLOWOUT CONTROL DEVICE has been developed by the Carter Oil Company Research Laboratory for Creole Petroleum Company. This tool, only 10 ft. long, 12 in. outside diameter and weighing 2500 lbs., was developed specifically for highly mobile use on Lake Maracaibo.

The device attaches to the well casing with elevators and weldless links. It is held to one side, out of the flow stream while being attached. Then it is swung over the stream which can blow both around the outside and through the bore of the tool. Mud pressure is then injected through a side port, ramming a piston-actuated packer 6½-ft. down into the casing.

Automatically and in rapid succession (20-25 seconds for total operation) mud pressure is applied, packer enters the well, flow is shut off and continued pumping of mud starts to kill the well.

Marine platforms



24. Diesel pile driver

ONE OF THE NEWEST money saving innovations in offshore operations is a one cylinder diesel pile driver for driving offshore drilling platform piles. The Delmag pile driving hammer is a one cycle diesel cylinder that attaches to the top of a pile and delivers 39,700 ft. pounds of force with every stroke, and averages 48 strokes a minute. Use of this pile driver frees the cranes for other jobs.

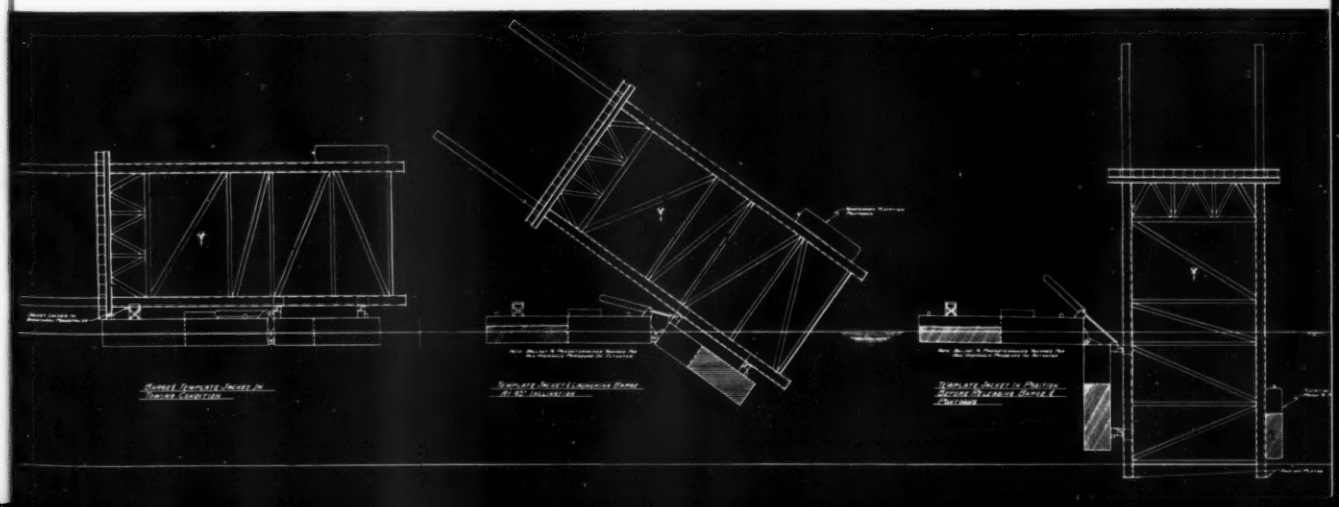
25. Sonic pile driver

SONIC PILE DRIVERS have been tested by at least one oil company on the West Coast. These pile drivers use rapid high frequency vibrations of very short stroke to drive piling at a fast rate. Production models are expected to have much lower initial and operating costs than present large steam and air pile drivers.

26. Hinged barge sets platform

PLATFORM LAUNCHING BARGE replaced a derrick barge in the setting of a multi-well platform offshore from Louisiana. This barge greatly reduced the time and cost of platform installation for owner Coastal Marine Drilling & Construction Corporation of Houston.

Platform launching barge is actually two barges connected by four heavy hinges and four 130 ton hydraulic rams. Ballast and rams tip the barge and start it and the attached platform into the water. The four rams are gradually pushed out and ballast increased until the submersible barge and platform are inclined 45 degrees. Then rams start acting as restraints, holding back the



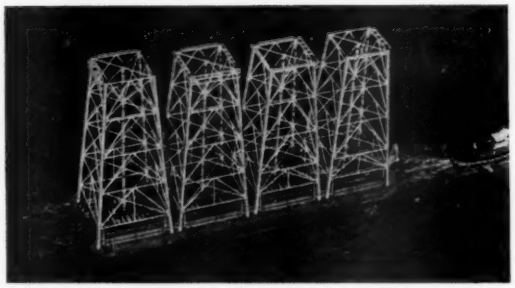
platform end allowing it to ease down slowly. Sealed spuds give platform added buoyancy.

After the platform is set in place, the submersible barge takes on additional ballast, lowering the launching section allowing barge to disconnect. Ballast is then pumped out and barge refloated. For picking up platforms, the process is reversed.

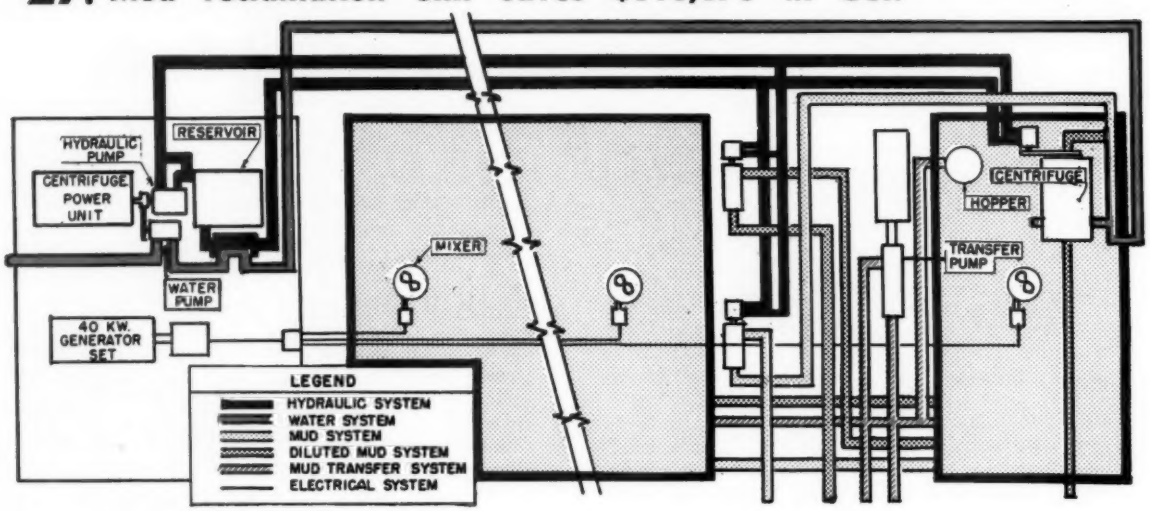
26. Aluminum platforms in the Lake

A NUMBER OF ALUMINUM platforms templates have been constructed by Bayou Boeuf Fabricators, Inc. of New Orleans for installation in the highly corrosive waters of Lake Maracaibo. In addition to their non-corrosive qualities, light weight cuts cost of foreign shipment.

Among the operators using these drilling platforms are Superior Oil Company, Lake Maracaibo, Signal Exploration Company and Venezuelan Sun Oil Company.



27. Mud reclamation unit saves $813,670 in Gulf



A BARGE MOUNTED MUD RECLAMATION SYSTEM saved Gulf Oil Corporation $813,670 in a year and a half. A transfer barge, reclamation barge, rig mounted centrifuge and a disposal pit are the four components of this money saving system.

The engineered system allowed Gulf to salvage all useful mud for reuse during a year and a half of field development in the Timbalier Bay Field.

Other advantages of the system included: 1) The ability to furnish mud to wells at predetermined densities; 2) reduced rig time spent mixing and conditioning mud; 3) a handy available supply of ready-to-use mud in emergencies; 4) reduction in amount of dry mud and chemicals stored at the rig; 5) reduced number of boat trips to the field to deliver chemicals; and 6) better control of mud disposition and costs.

Drilling from floating vessels

28. Over forty 2400-ft. core holes drilled in Gulf

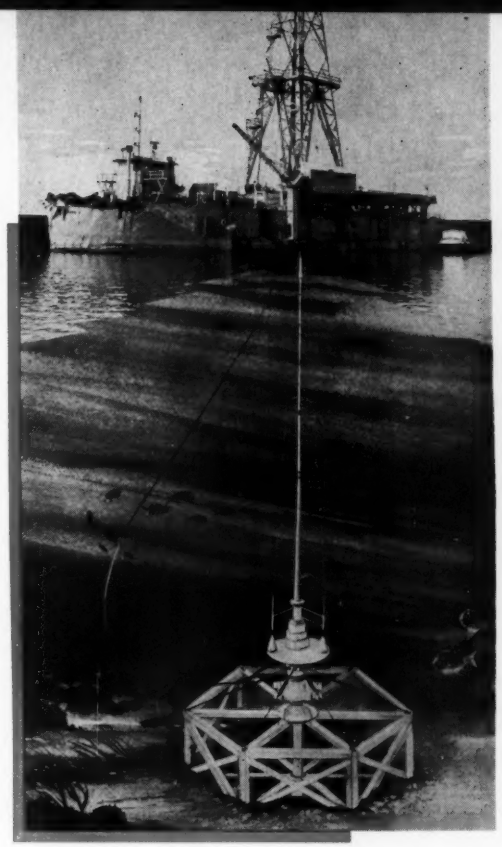
THIS DRILLING TECHNIQUE coupled with underwater completions may be the economical solution to the high cost of deep water exploration and production. Brown & Root Marine Operators, Inc. and McClelland Engineers, Inc. introduced drilling from floating barges into the Gulf of Mexico when they drilled over 40 stratigraphic test wells in 30 ft. of water off the Texas Coast.

Tests were drilled for the Texas Gulf Sulphur Company from two barges, the U-303 and the

Champion. The equipment was capable of drilling in 200 ft. waters without modification and in 500 ft. waters with onl yslight modification.

Drilling, cementing, coring, electric and radioactive logging, caliper surveys and directional control surveys have all been carried out from these floating bases without difficulty.

At present, McClelland is outfitting a new barge for petroleum exploration in the Gulf.



29. Cuss Group drills in water —1500-ft. deep

THE CUSS GROUP made up of Continental, Union, Shell and Superior Oil Companies has developed and patented a method of drilling in waters up to 1500-ft. deep, from floating vessels such as the unit pictured at right.

This system involves establishment of an operating base on the ocean floor. Base contains a hexagonal foundation supporting conventional blowout preventers, packoff assembly and connections for mud return lines. The base is connected to a floating barge by flexible guide cables. Drilling is carried on through the base.

Improvements in tubular goods

30. High tensile steel X-135 here—X-200 on way

A NEW WELL CASING designated V-150 has been developed with a minimum yield strength of 150,000 psi. This casing is designed for the bottom hole pressures of today's deepest wells.

A still higher grade of material is under development for X-200 casing with a 200,000 psi minimum yield strength.

Drill pipe is also getting stronger. X-135 drill pipe, with 135,000 psi minimum yield strength is being tested for tomorrows deeper drilling.

New buttress or square threads on this casing eliminates the necessity for upsetting the ends of casing to increase the joint strength. Buttress threading imparts up to fifty percent greater strength to the joint than is found in the api long thread.

These steel strength advances have been made by The National Tube Division of the United States Steel Corporation.

31. Patching casing

A PLASTIC CASING PATCH has been developed by Pan American Petroleum Corporation which is fast and easily applied, has a tensile strength of 48,000 psi, and reduces the inside dimension of the pipe patched only slightly.

Tool for applying the patch has only one principle part, an inexpensive inflatable mandrel. To repair a leak fabric strips are cut to the proper length and width to cover the mandrel. (Size of the mandrel is determined by the size of the casing and leak being patched.) Catalyzed plastic is spread on the fabric strips and wrapped on the mandrel.

Mandrel is then lowered into the hole on the tubing and water or oil is pumped down the tubing, inflating the mandrel and pressing the plastic patch securely against the casing wall. Excess plastic is squeezed through the leak and rivets itself to the casing.

After 12 to 24 hours the mandrel is released and removed leaving a smooth thin patch on the inside of the casing.

32. Hydraulic landing table

A LANDING TABLE that takes the shock off the pipe and surface equipment was developed as a safety measure in drilling the world's deepest well in West Texas. The table is as simple as a barber chair. A hydraulic system is opposed by high pressure nitrogen gas in BOP type accumulators. The nitrogen acts as a spring when the heavy load of the pipe is applied to the table.

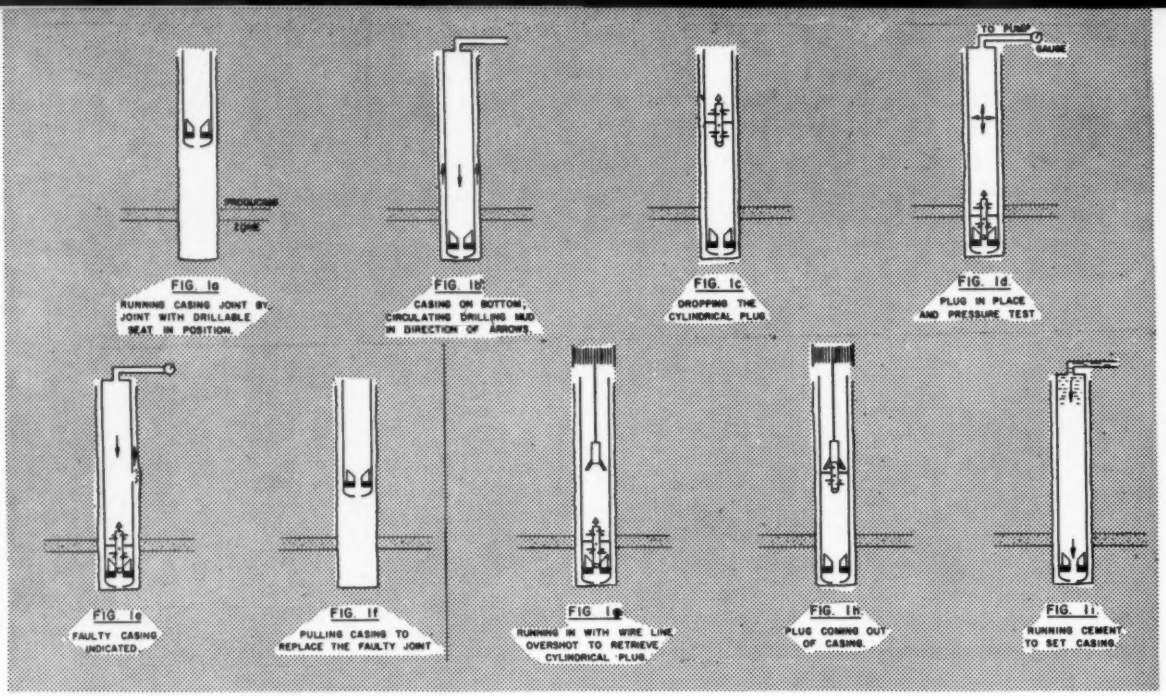


FIG. 1a
RUNNING CASING JOINT BY JOINT WITH DRILLABLE SEAT IN POSITION.
FIG. 1b
CASING ON BOTTOM, CIRCULATING DRILLING MUD IN DIRECTION OF ARROWS.
FIG. 1c
DROPPING THE CYLINDRICAL PLUG.
TO PUMP
GAUGE
FIG. 1d
PLUG IN PLACE AND PRESSURE TEST.
FIG. 1e
FAULTY CASING INDICATED.
FIG. 1f
PULLING CASING TO REPLACE THE FAULTY JOINT
FIG. 1g
RUNNING IN WITH WIRE LINE OVERSHOT TO RETRIEVE CYLINDRICAL PLUG.
FIG. 1h
PLUG COMING OUT OF CASING.
FIG. 1i
RUNNING CEMENT TO SET CASING.

33. New method tests casing in the hole

OVER A MILLION feet of casing in 250 wells have been pressure tested with a new tool developed by Marco Limited of Canada.

Casing test for a 5000 ft. well averages one hour rig time. Ten casing failures (4.3% of casing tested) have been detected to date, and these were replaced for an average cost of $850 each.

Couplings as well as joints are pressure tested in the hole but before cementing.

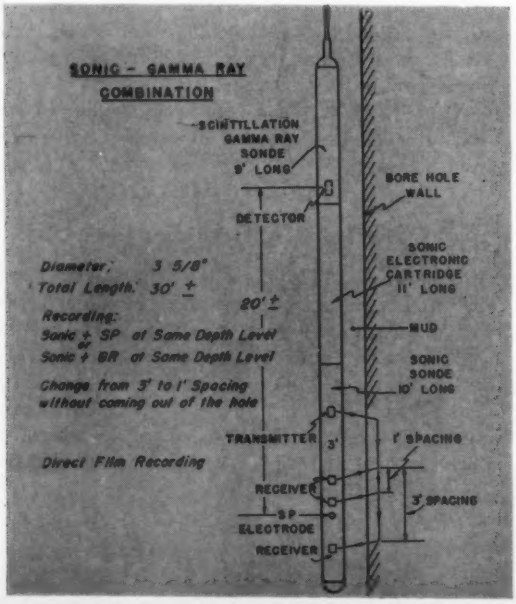
Drilling and Service Corporation of Dallas has recently been given the U. S. franchise for the testing method.

Interpretation of seismic records

34. Sonic logging

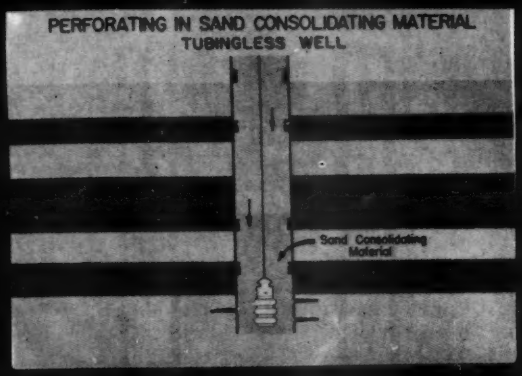
A NEW SONIC LOGGING instrument developed by Humble Oil and Refining Company and Schlumberger Well Surveying Corp. gives a more accurate detection and measurement of porosity than previous instruments.

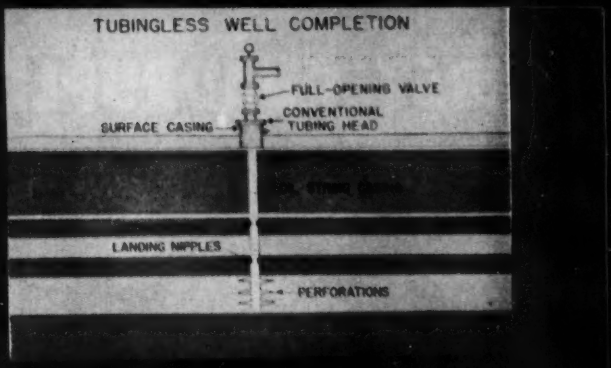
The log is not affected by statistical variations; it is almost insensitive to hole-size variations or logging speed; and, is not affected by the formation above or below the units two receivers.

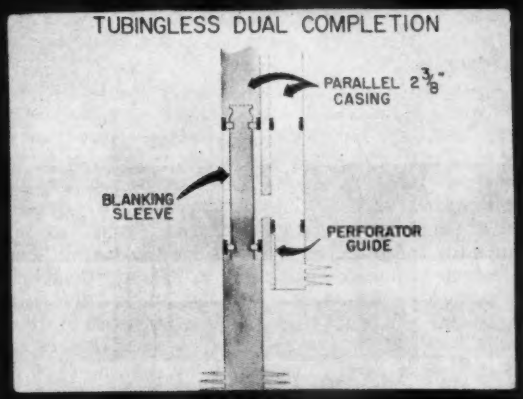


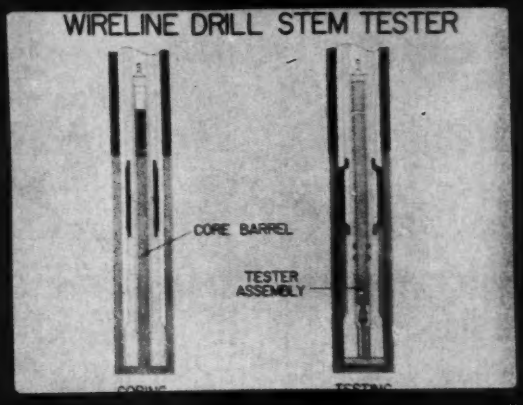
35. Electronic seismic dip plotter

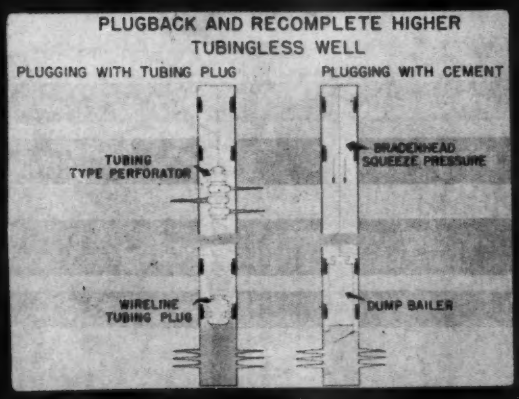
SINCLAIR OIL is using an electro-mechanical dip migrating machine which rapidly and accurately plots, in either time or depth, migrated dip segments obtained directly from seismograms, rapidly constructs migrated dip sections from offshore surveys and it has also proven useful in detailed seismic re-interpretation. It is 800 to 1000 percent faster than manual plotting with superior accuracy.

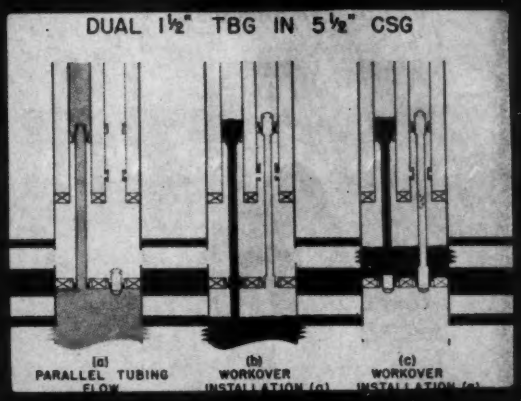

PERFORATING IN SAND CONSOLIDATING MATERIAL
TUBINGLESS WELL
Sand Consolidating Material

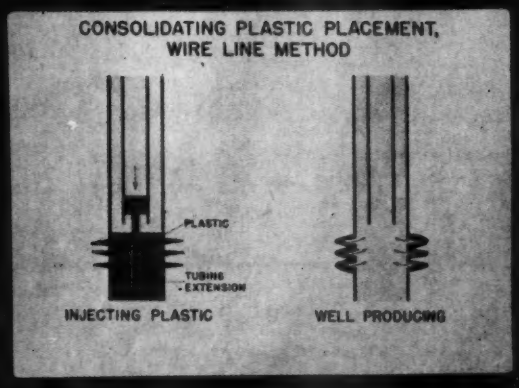

TUBINGLESS WELL COMPLETION
FULL-OPENING VALVE
CONVENTIONAL TUBING HEAD
SURFACE CASING
LANDING NIPPLES
PERFORATIONS

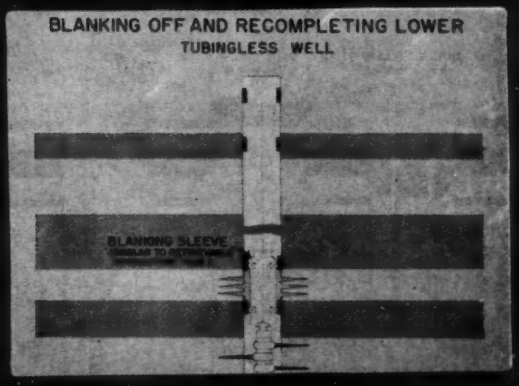

TUBINGLESS DUAL COMPLETION
PARALLEL 2 3/8" CASING
BLANKING SLEEVE
PERFORATOR GUIDE


WIRELINE DRILL STEM TESTER
CORE BARREL
TESTER ASSEMBLY


PLUGBACK AND RECOMPLETE HIGHER
TUBINGLESS WELL
PLUGGING WITH TUBING PLUG
PLUGGING WITH CEMENT
TUBING TYPE PERFORATOR
BRADENHEAD SQUEEZE PRESSURE
WIRELINE TUBING PLUG
DUMP BAILER


DUAL 1½" TBG IN 5½" CSG
(a)
PARALLEL TUBING
(b)
WORKOVER
(c)
WORKOVER


CONSOLIDATING PLASTIC PLACEMENT,
WIRE LINE METHOD
PLASTIC
TUBING EXTENSION
INJECTING PLASTIC
WELL PRODUCING


BLANKING OFF AND RECOMPLETING LOWER
TUBINGLESS WELL
BLANKING SLEEVE

FIRST QUADRUPLE STRING COMPLETION

Utilizes Brown Hydraulic Set Retrievable Packers

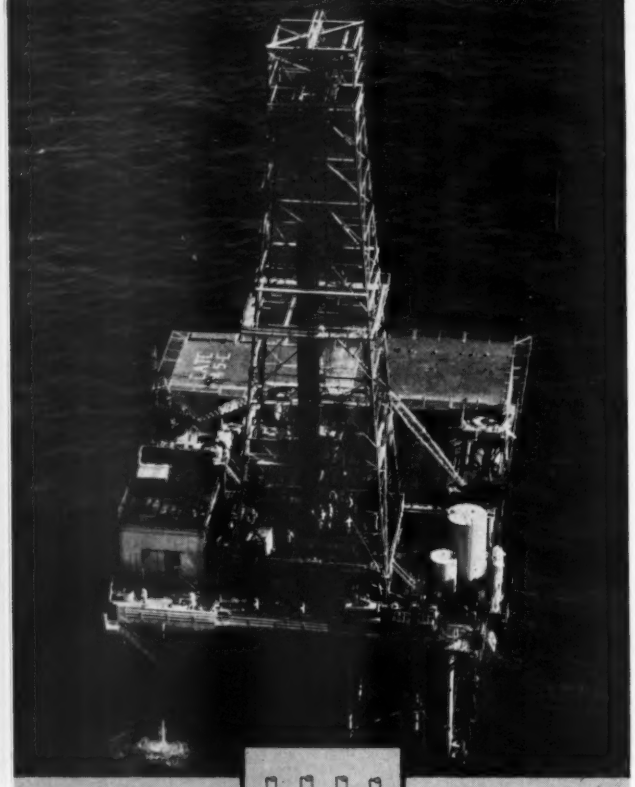
Oil Industry history was made in June of this year when the first quadruple string completion was made in an oil well by the CATC Offshore Group (Continental Oil Co., Atlantic Refining Co., Tidewater Oil Co., and Cities Service Production Co.). The well, the West Delta Block 30 Field, State 970, No. C-8, is located in offshore Plaquemines Parish and is the first well in history to produce four different zones through four individual tubing strings.

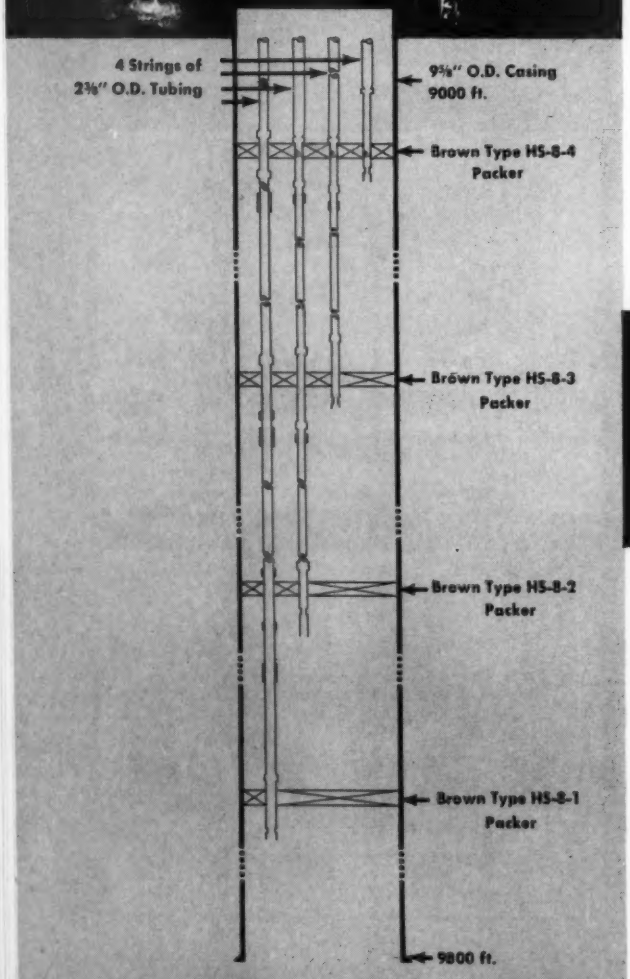
Four Brown Hydraulic Set Retrievable Packers were used in the well completion operation and installed by Brown Service Engineers. All four packers were run on the number one string and set in the interval of 9,000 to 9,800 ft. Each packer was set individually and tested from both directions prior to setting the next packer.

Years of research and testing went into the development and manufacture of the HS-8 Series packers. Single and dual Hydraulic Set Packers were successfully used over two years ago. A short time later, after continuous research, the triple string packer was perfected and accepted by the industry. Now, the development of the first quadruple string packer marks another engineering milestone in Brown's long history of firsts.

Brown equipment was used in the first detachable dual string completion, the first detachable triple string completion, and *now,* the first quadruple string completion.

Let "P·R·I·M·E Completions by Brown" save you money. For complete brochure on Hydraulic Set Packers write Brown Oil Tools, Inc., P. O. Box 19236, Houston 24, Texas.




4 Strings of 2⅜" O.D. Tubing
9⅝" O.D. Casing 9000 ft.
Brown Type HS-8-4 Packer
Brown Type HS-8-3 Packer
Brown Type HS-8-2 Packer
Brown Type HS-8-1 Packer
9800 ft.

Packers used in CATC quadruple string completion

BROWN
OIL TOOLS, INC.

8490 Katy Road, Houston, Texas.

New Imports Formula Hit By Producers of Foreign Oil

Major importers have come out strongly against the new oil imports program based on refinery runs rather than historical pattern.

The new pattern will go into effect east of the Rocky Mountains January 1, unless modifications are made. Imports Administrator Matthew V. Carson permitted oil companies a month in which to make comments.

According to the plan only 10.1 percent of crude and unfinished oils may be imported. Estimates place beginning imports at 826,300 bbls. per day under the program.

Commenting on the program, J. W. Foley, president of The Texas Company said, "We shall strongly urge that the proposed formula be modified to provide companies such as ours with an imports allocation that will assist in the protection of those assets which we have developed abroad."

Henderson Supplee, Jr., president of The Atlantic Refining Company, declared, "The new plan violates the most fundamental principle of private enterprise, namely that companies which assume the risk of investment in productive facilities are entitled to expect a fair return from their investment. . . . Atlantic alone has invested approximately $120 million in overseas crude sources. Other companies similarly affected have invested additional hundreds of millions of dollars."

Bahamas

Another Oil Company Gets A Huge Andros Island Lease

Consolidated Cuban Petroleum Corporation has been granted a 1500-sq. mi. onshore and offshore exploration concession on Andros Island, largest in the Bahamas group.

Recently Siebens Leaseholds, Ltd. announced the acquisition of a 524,800-acre concession on Andros Island.

The island lies 100 mi. southwest of a wildcat well being drilled on Cay Sal Banks by Zapata Off-Shore Company's mobile unit, **Scorpion.**

California

Offshore Leases Quitclaimed, 3 Firms Drop $4.7 Million

Two offshore leases off Huntington Beach, Calif., have been quitclaimed after the operators failed to discover any promising oil signs.

Seaboard Oil Co., Monterey Oil Co., and Humble Oil and Refining Company paid bonuses of $4.7 million for the concession.

After an extensive oil search on the blocks—one 1280 acres and the other 1355 acres—the firms decided to call it off.

Pacific Driller No. 1 Called To Drill on New State Lease

California's first offshore mobile unit will soon be drilling again.

Pacific Driller No. 1, which has been tied up at Long Beach since early 1957 when it drilled its first hole, a stratigraphic test off Huntington Beach, has been towed to a new lease off Santa Barbara County.

The big mobile unit will drill the first wildcat on a lease secured last July by Standard Oil Company of California and Humble Oil and Refining Company with a bid of $12,423,598. The 3840-acre lease, designated Block C, was one of five concessions off the California coast which set a new leasing record for United States bluewater leases.

A partnership in **Pacific Driller No. 1** has been purchased by William Rand of Submarex, who will operate the unit. Offshore Constructors, Inc. were originally sole owners.

Pacific Towboat and Salvage Company towed the big mobile unit to the lease which is located three mi. north of Santa Barbara and ¾ mi. offshore.

Japan

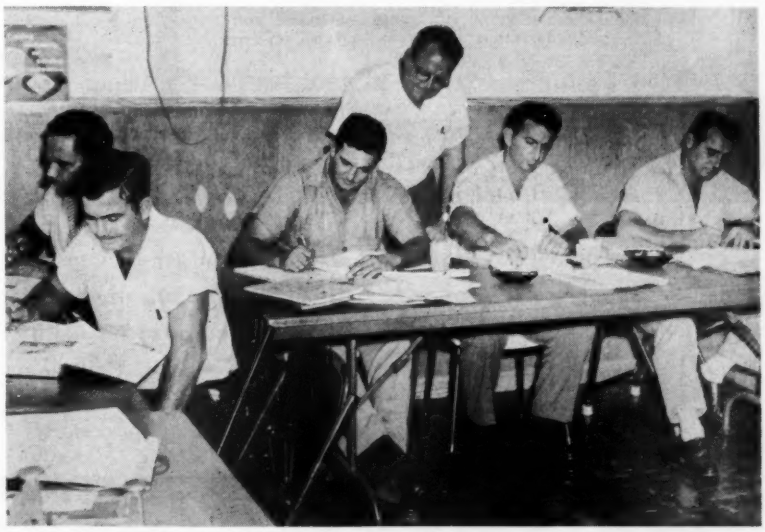
Japan's First Marine Test Drilling in Big Island Lake

A new mobile unit being built in Akita Harbor, Japan, will not be the first to drill an overwater test in Japan after all.

In Lake Hachirogata, a rig is drilling a wildcat well in three ft. of water to test an anticline discovered during seismic surveys.

The Kotohama No. 1 is located 1¼ mi. from shore and is twelve mi. northwest of Akita City situated in northern Honshu. Japan Petroleum Exploration Company, jointly owned by the Japanese government and pri-

(continued on page 37)



"Captain Van's" School of Navigation now has 20 men enrolled in classes held in an air-conditioned classroom at Groves, Texas, just outside Beaumont. Captain John F. Vandegrift, sponsor for the school, says that five men have already passed the Coast Guard examination and received their licenses. Left to right are Captains Joseph A. LeFort, "Pete" McCall and E. P. Miller, all of Pure Oil Co.; "Captain Van"; Mr. Hoyt L. Bazaar, The Texas Co.; and Captain Robert J. Daigle, John W. Mecom.

Q. How to get more for your offshore transportation dollar?

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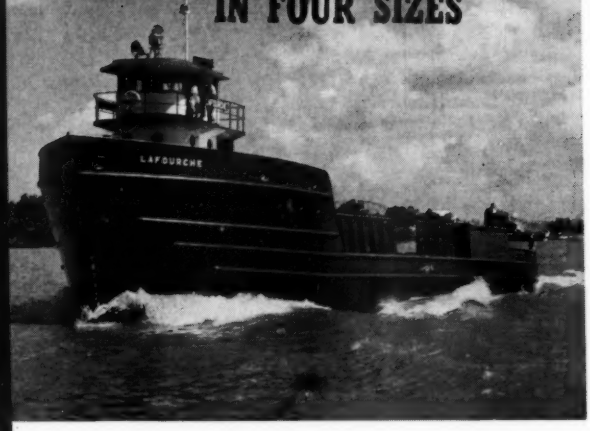
30 Modern Vessels - - the Largest Fleet Offshore

15 CREW/SUPPLY BOATS IN TWO SIZES

15 SUPPLY VESSELS IN FOUR SIZES



85 footers

65 footers

650-ton capacity

550-ton capacity

475-ton capacity

350-ton capacity

Plus **DECK AND OIL BARGES**

With the TWENTY GRAND fleet you can get the one right combination of crew and supply vessels for your particular operation, whether you have one or a dozen marine rigs to service. Let us show you how this versatile fleet can provide the most economical solution to any supply problem. Call today. No obligation, of course.

TWENTY GRAND towing INCORPORATED

OFFSHORE OIL CENTER, MORGAN CITY, LOUISIANA — PHONE: MORGAN CITY 5013

News . . .

(continued from Page 35)

vate interests, will drill to 5000 ft.

The company decided to drill the test after discovery of a new onshore field four mi. to the west at Sarukawa.

Louisiana

Gracey-Hellums Rig Sets New Deep Drilling Record

A rig owned by Gracey-Hellums Corporation recently set in Timbalier Bay what appears to be a new world's record for deep wells.

Barge 3 drilling for Union Oil Company of California in the Caillou Island completed a 13,778-ft. well in fourteen days and three hours. Well was designated No. 14.

Barge 3 is diesel powered with drawworks driven by three 520 hp diesel engines. Even more remarkable is the fact that the Gracey-Hellums crew headed by Toolpusher Marion Cook and Relief Toolpusher E. S. Banks, were not out to set a new record.

State Mineral Board Halts Further Offshore Leasing

State Mineral Board of Louisiana has called off further offshore leasing due to the small interest shown by bidders.

The state had estimated that lease sales on offshore lands would net $25 million in bonuses for this fiscal year. However, the one lease sale held brought only $445,000 for 7700 acres. This was an average of about $57.36 per acre, compared to the $1000 per acre bonuses often paid in recent years.

William G. Helis, chairman of the Mineral Board, said it would take some drastic improvements to induce the state to resume leasing of marine acreage. The board originally changed its schedule from monthly to bi-monthly sales, when operators began to show lagging interest.

FPC Overrules Its Staff On Offshore Gas Prices

A recommendation by the staff of the Federal Power Commission concerning offshore gas prices has been overturned by the FPC.

FPC says Transcontinental Gas Pipeline Corporation may purchase gas from 26 Louisiana offshore and coastal producers for 22.4 to 23.3 cents per mcf rather than the 17 cents formerly set by the staff.

Middle East

Middle East Production Shows Sharp Rise Over First of '57

In the Middle East, where new offshore concessions continue to increase, oil production rose nearly a million barrels during the first half of this year over the first half of 1957.

Kuwait, leading oil producer in the Middle East with 1.4 million bbls. daily, experienced the bggest production jump—335,000 bbls. per day. Average daily production statistics for other Middle East nations with prospective offshore oil lands are Saudi Arabia, 991,300 bbls. daily; Iran, 805,200 bbls. per day; and Quatar, 171,600 bbls. daily.

Morocco

Marine Leases Play Big Role In Stepped Up Oil Program

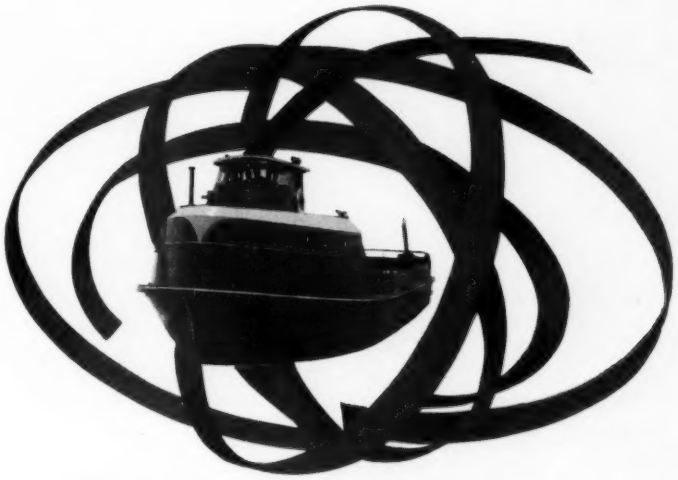
With one major offshore-onshore tract already leased, Morocco is aiming toward letting additional leases.

One major region up for lease is Zone III along the Atlantic coast. It is one of three oil zones estab-

(continued on next page)

George Engine

takes the red tape out of boat buying and financing



One hour of your time is all that is required to complete the purchase of a crew, tug or fishing boat. Here's why –

1. We will have your boat built to your specifications.
2. At the shipyard of your choice at the same price the shipyard would charge you.
3. We will see to it that the boat is properly G. M. Diesel powered.
4. We will deliver your boat afloat or aboard ship at port of your choice.
5. Your boat will be delivered to you completely documented in accordance with all U. S. Coast Guard, U. S. Customs and U. S. Maritime requirements.
6. We handle every detail and will finance it so you can make money and pay for your vessel without a lot of red tape.

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News . . .

(continued from preceding page)

lished under a new Moroccan law designed to encourage exploration by foreign companies.

Initial grant under the new 50-50 standard agreement went to Agip Mineraria, state owned Italian agency.

The agreement which covers the Tarfaya region and its coastal waters (10,000 sq. mi. in all) is similar to the one the Italians negotiated with Iran last year.

Nigeria

New All-Steel Barge to Drill Wildcat in Niger River Delta

Petroleum Company of Nigeria, Ltd. Shell B-P has transferred its new all-steel drilling barge to a drill site at Krakama in the Niger River Delta.

The new rig, first of its kind to be used in the Nigerian oil exploration, had just drilled a dry hole to a total depth of 12,023 ft. in the bed of the River Bonny, 40 mi. south of Port Harcourt.

Offshore oil fields have now been discovered at Soku, 30 mi. west of Port Harcourt, and at Afam, 45 mi. west of Port Harcourt.

Meanwhile seismic operations have been extended to the Rio del Rey swamps of the Southern Cameroons, a region located east of Port Harcourt.

Here Shell-BP is confronted with thick mangrove swamps in waters with a minimum depth of three ft.

Persian Gulf

Arabian Oil Co. Soon Will Tell Neutral Zone Contractor

Arabian Oil Co., already conducting a seismic survey in its portion of the Persian Gulf Neutral Zone, is ready to decide who will be the drilling contractor.

The company has offers from Dutch, Italian and U. S. firms. The drilling program will get underway next year with three to five wells drilled per year.

More than $5 million will be invested in the operation, with about 60 percent of the total going for a mobile unit, labor and a towing barge.

Meanwhile, Taro Yamashita, president of the company, has reported that additional capital would have to be secured by next year.

Presently, the firm holds a paid-up capital of about $10 million, but is authorized to possess about three times that much.

Financing will be accomplished through the 52 manufacturing firms and ten individuals which hold an interest in the company, with additional financing coming from banks.

Supreme Court

Brief Asks That High Court Reverse Memphis Decision

The Government and major pipelines have asked the United States Supreme Court to reverse the decision of the District of Columbia Appeals Court in the Memphis Case.

Solicitor General J. Lee Rankin filed a brief for the pipeline industry and the Federal Power Commission.

Gist of the Memphis Decision is that a pipeline company can not make application unilaterally for a rate increase without agreement of all its customers.

When the decision was first handed down, pipeline firms and the government lost no time in appealing it to the highest court. The matter was delayed until the fall

(continued on Page 41)

HARDY-GRIFFIN Super-Slim

"SS" TUBING JOINTS

Tested to 10,000 lbs. in your own office!

You can see the Hardy-Griffin "tight seal" hold at pressures up to 10,000 lbs. in your own office with the portable test unit shown below. You will also see the 100% plastic lining protection and the Teflon* Seal Ring that provides the long life and positive sealing of Hardy-Griffin Super-Slim "SS" Tubing Joints.

Call your Hardy-Griffin representative today for an actual demonstration of the superiorities of the "SS" joint.

100% Protection Using HGT-SS Tubing Joint

* DuPont Tetrafluoroethylene Resin

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New

High Performance RCA Radar

with dual pulse length...

for sharper pictures close in

and longer range far out!

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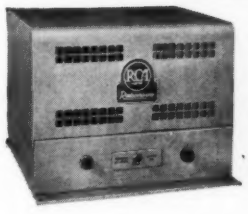
Here's performance-plus! Dual pulse length provides shorter pulses (1/10 microsecond) on 1, 2 and 4 mile ranges for sharper pictures and best minimum range to pick up low lying targets in river and harbor navigation . . . longer pulses (4/10 microseconds) at 12 and 32 miles for increased range, stronger targets when navigating at sea or making landfalls. Receiver bandwidth switched automatically with pulse width. Convenient 10-inch scope delivers easily readable, map-like display. Ideal for navigating, position-finding and anti-collision service.

Here's economy-plus! Space saving, lightweight design—unit contained in one binnacle-type cabinet. Requires less than 2 square feet of deck space. Peak power with lowest power drain. Built-in tune-test meter for quick maintenance checks. In performance, in price, insist on a look at RCA's CR-107 Shipboard Radar.

Let us send you free information on how RCA Radar can upgrade your operational efficiency and profits!

IMPORTANT OPERATING FEATURES: **DUAL RECEIVER BANDWIDTH • PREFERRED 3.2 CM SUPER HIGH-FREQUENCY BAND • 7 KW PEAK POWER • NO WAVEGUIDE REQUIRED • 1-2-4-12-32-MILE RANGES • CHOICE OF ANTENNA (OPTIONAL) FOR SPECIFIC APPLICATIONS • OPTIONAL 1.3 AND 1.9 DEGREE HORIZONTAL BEAM WIDTH**

SEE THESE *New* RCA "WORKHORSES" FOR THE WORKBOAT FLEET



RCA Rate-of-Swing Indicator (CRM-G1A)—new RCA "Swing-O-Meter" enables precision maneuvering of barge tows, lighters, carfloats, etc. Indicates rate-of-turn or swing of any vessel up to 0.5 degrees per second to port, starboard, or straight course.

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RCA Model ET-8060—new, versatile 20-channel radiotelephone. Designed for remote push-button channel selection. Frequency range 2 to 9 mc or 1.650 to 9 mc. FCC type accepted.

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at an honest-to-gosh economical price!

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Because of the tremendous demand for these unions, our production runs are much greater than ever before. Consequently, our costs are lower . . . and the savings are passed on to you.

Despite the low prices, the Figure 301S is a real oil field union . . . long subs for plenty of wrench space; heavy walls to withstand severe wrenching; big, rugged nut with coarse, precision-cut threads for easy starting and make-up with gloved hands; and the same high quality machine work to which you have been accustomed.

Ask at your supply store for the new Figure 301S Unions. Use them wherever a hex nut union is applicable; wherever an absolute pressure or vacuum-tight seal is necessary. The price will please you—the performance is unexcelled. Furnished for cold working pressures of 1000 and 3000 psi; sizes 1/8" through 3"; plain or cadmium-plated.

...the original flat-face design

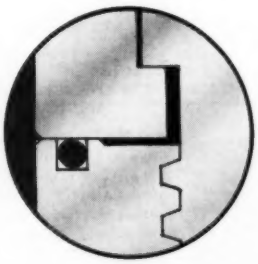

Figure 301S Unions employ the same flat-face design that was introduced by Yale Machine Works in 1947. This design has been proved in hundreds of thousands of installations to provide an absolute pressure-tight, vacuum-tight seal with liquids, gas or vapor. It is the finest, most reliable union seal ever developed . . . and is now available at new low prices in Figure 301S Unions. Buy them at your supply store.

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Osborn Eng. Sales Co.—Edmonton, Canada
Dallas & Cope—Wichita Falls, Texas
Howard Cooke—Ardmore, Ohio
R. F. Krause—Alaska

(Continued from Page 38)
session of the Supreme Court, although the government and companies affected sought a decision last spring.

Texas

Petroleum Extension Offers Course in Blowout Control

Petroleum Extension Service of the University of Texas is offering a program to train oilwell drilling personnel in the prevention and control of blowouts, a long time drilling hazard.

An instructor's outline, comprehensive training manual, and two sound-and-color motion pictures were prepared for the course under the co-sponsorship of the American Petroleum Institute and the American Association of Oilwell Drilling Contractors.

Reed Roller Bit to Invest $25 Million in Next 5 Years

New management of Reed Roller Bit Company, Houston, has announced plans for investing $25 million in the next five years on retooling, research and sales.

The Houston area will benefit from $20 million of the total, according to John F. Maher, president of the giant drilling tool company.

Reed has also restored the ten percent cut in pay levels, which had been brought on by the recession, and rehired a number of employes which had been laid off.

Ken Davis Unites Nine Supply & Service Companies

Nine equipment supply and service companies have been incorporated under a single management headquartered in Fort Worth and headed by Ken W. Davis.

Affiliated with new Kendavis Industries, Inc., International are Unit Rig & Equipment Co.; Loffland Brothers Co.; Loffland Brothers Co. of Venezuela; Loffland Brothers de Venezuela, C.A.; Loffland Brothers de Caracas, C.A.; Loffland Brothers Co. of Peru; Loffland Brothers Co. of Canada; Stratoflex, Inc.; Stratoflex of Canada, Inc.; Mid-Continent Cummins Export Corp.; Mid-Continent Supply Co.; Mid-Continent Supply Co. of Venezuela, C.A.; Great Western Drilling Co.; Compania Pionera de Venezuela, C.A.;

(continued on page 52)

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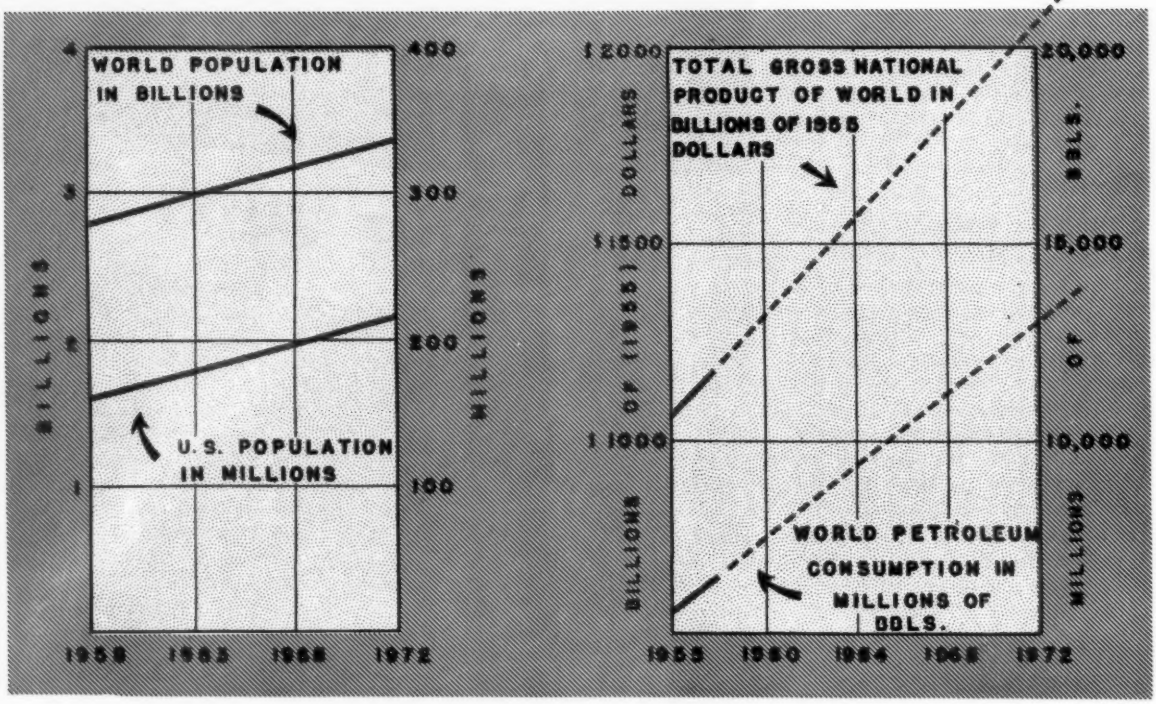
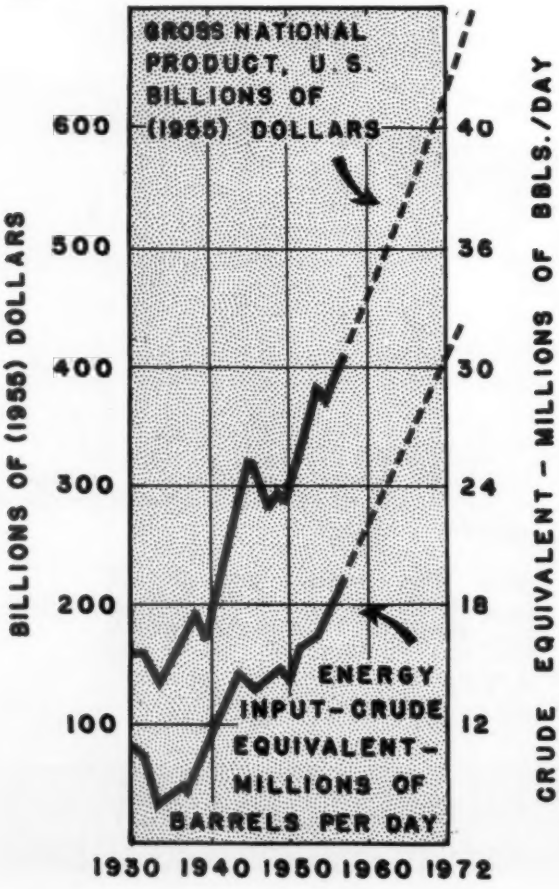


WORLD POPULATION and U. S. population curves show an increasing number of energy users in the future. At right, total incomes are rising and this means more energy will be consumed. Before the end of the century, the U. S. will probably exceed $1 trillion annual income!



Offshore Oil's Part in Future World Economy

Most crystal balls say world population will continue to climb as will the Gross National Products (or total incomes). World GNP, now rated at $1200 billion will reach $2024 billion in 1972 say some of our economists, and U. S. income will soar from $420 billion per year to $683 billion during the same period. Energy consumption follows GNP curves and barring an atomic war, the world will likely to be consuming oil at the rate of 13.5 billion barrels annually in 1972 as compared with 6.3 billion in 1957 (including an estimated 664 million bbls. for Russia and its satellites.) To meet these increased demands, offshore oil properties all over the world must be produced! In our own country, regulatory bodies must encourage this development through sensible administration; and the oil industry must find cheaper operating techniques for deep water.

THANKS to miracle drugs and other advances in medicine, the population of the earth is soaring higher and higher at the rate of 1.3 percent compounded annually. Population of this planet today is estimated at 2.67 billion and Ebasco Services, Inc. of New York has predicted it will reach 3.24 billion by 1972.

During this same period, incomes will advance. Forecasts say the Gross National Product (or total income) will soar from its present level of about $1,200,000,000,000.00 annually to $2024 billion 14 years hence! (This is based on 1955 dollars.)

In the U. S. population is very much on the upswing; it will rise from an estimated 178 million in 1960 to 214 million in 1972. During the next 14 years, total income or GPN will advance from its present level of about $420 billion per year to $673 billion!

What does this mean to the oil industry? Just this—as the total income or GPN rises or declines, the total energy consumption increases or decreases. The two are closely linked. You will note that the accompanying curves illustrate this in the past, and with a population gobbling up more and more energy per capita, this trend likely will not slack off.

In the immediate future, oil will continue to hold its percent of the energy market despite atomic and solar energy inroads for the simple reason that it supplies energy in the most desireable form for many uses.

By 1972 when world income exceeds $2000 billion annually, petroleum will be consumed at the rate of about 13,470 million barrels annually. This includes an allowance of 1440 million barrels for Russia and its satellites. In 1957 the total world production of liquid hydrocarbons came to an estimated 6,285 million barrels (with an allowance of 664 million barrels for the Red countries).

Ignoring the Russian areas for the moment, let's take a look at the free world oil picture. At the beginning of the year, the total proved crude reserves of the free world were estimated at 229 billion barrels. About 71 percent of this amount—or 164 billion barrels—is in the Middle East.

How long will these reserves last?

Last year the free world produced 5.6 billion bbls, and at this rate today's reserves would last for 41 years even if no additional oil were discovered. However, in light of the predicted increase in consumption, the life of these reserves should be estimated at less than 25 years. It goes almost without saying, that in a favorable economic and political climate, additional reserves will be discovered to prolong our oil supply as they have in the past.

Take a look at the oil reserve picture in our own country for instance. In 1925 proved reserves were estimated at 8.5 billion bbls., yet we produced double this amount by 1945. At this latter date, reserve estimates were at 23.5 billion bbls., yet we produced more than this amount in the next 12 years and at the same time substantially increased our reserves.

However, the U. S. is now producing oil faster than new reserves are being found and this brings us to the offshore oil industry's role in

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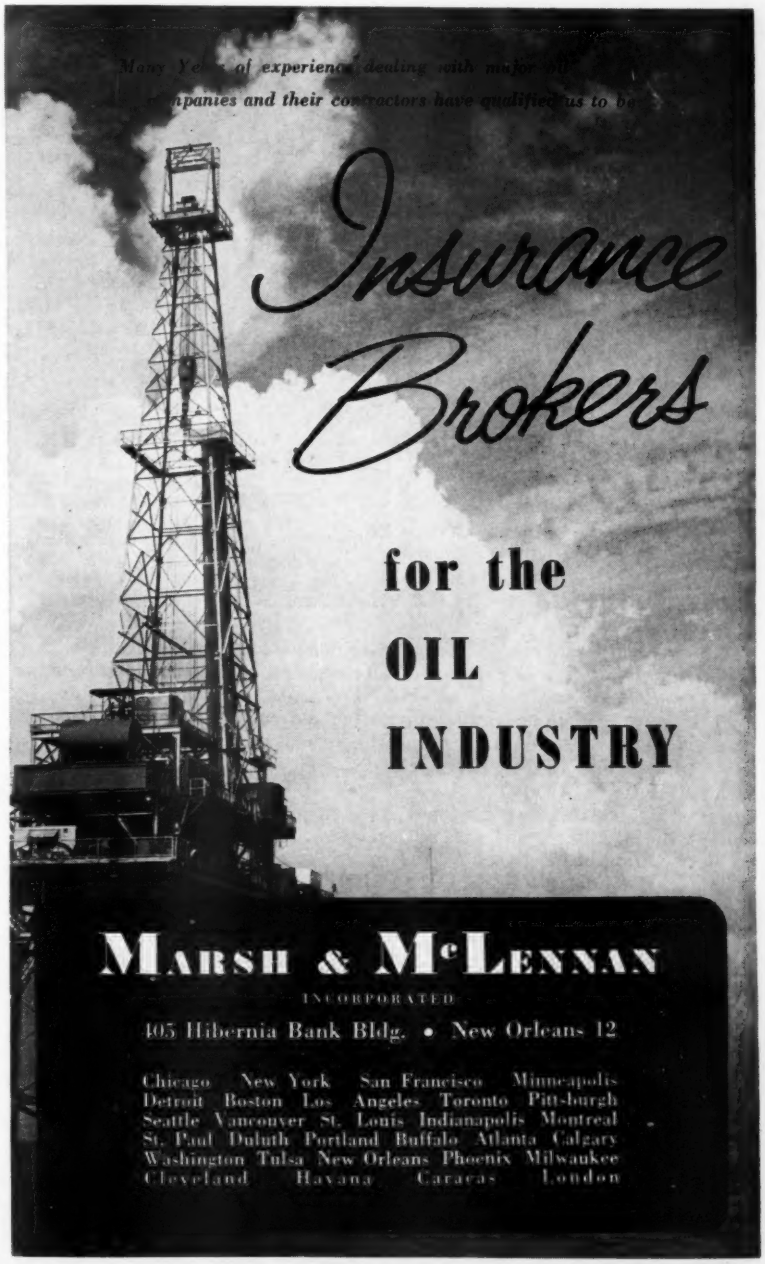
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Future Of Oil . . .

(continued from preceding page)

the world and the U. S. oil picture. In order to gain on oil consumption we must turn to our tidelands.

Vast areas of our continents lay beneath salt water today, as the result of the rising sea in the last 25,000 years. These vast areas form the true limits of the various continents, and for the most part are sedimentary. Much of the land is exciting so far as the petroleum geologist is concerned, and in this regard it should be pointed out that some of our most prolific oil producing areas lie beneath water.

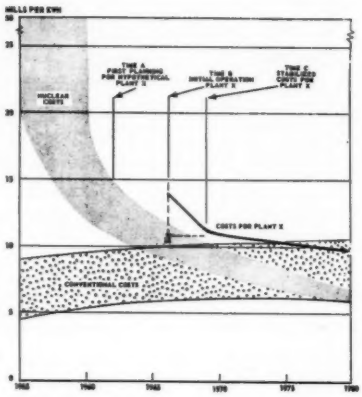
In light of the growing world and local demand, the oil industry will be forced to explore all possible oil producing areas, and none afford better prospects than the tidelands if economic hurdles can be overcome.

The most exciting oil region in the U. S. at this time is the continental shelf in the Gulf of Mexico. To date, approximately 0.9 billion bbls. of crude have been discovered, and natural gas could be rated at about 5.5 trillion cubic feet. Guesses as to the total amount of oil that can be found in this region vary widely, but so far, about 39 percent of all wildcats drilled in the Gulf have produced oil or gas. One industry spokesman has stated that the industry would do well to set a target to find 6 billion bbls of oil and 30 trillion cu. ft. of gas in the immediate future. In view of our shrinking domestic reserves, this oil and gas will certainly be needed if this country is to maintain a comfortable supply.

What is the ultimate quantity to be found in the Gulf? It could be staggering, because there is little reason to believe that there will be less oil and gas found there than on adjacent onshore lands. Moreover, the slopes of the continental shelves may also be oil producing.

Needful as an increased tempo in offshore development has become, low allowables and excess governmental regulation has slowed our efforts in this regard. So the first step to maintaining this country's independence—so far as petroleum is concerned—is for the governmental agencies to cooperate with the offshore oil operators.

At the same time, the oil industry must find economic methods to explore and develop the tidelands—not only in the Gulf—but all over the world.



ATOMIC ENERGY will not compete greatly with oil for some years because of high costs. Most expensive feature is the high cost of safety factors that must be designed into plants. As it is, oil requirements will just about double by 1972 with atomic energy taking up some of the soaring energy requirements.

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Featuring the drillers . . .

AAODC Meeting Kicks Off

Eighteenth annual meeting of the American Association of Oilwell Drilling Contractors in Dallas October 1-3 will feature financial and technical phases of the oil business in three general sessions.

Robert Bruce Atwood, chairman of the Alaska Statehood Committee and editor and publisher of the Anchorage Daily Times, will tell the national gathering of oilmen about the forty-ninth state. Alaska is looked to by oil men as one of the world's most promising undeveloped oil regions.

Thursday afternoon, drilling contractors will hear an address by national AAODC President J. U. Teague, president of Columbia Drilling Company, Houston. Presiding at that session will be Wm. P. Clements, Jr., president of Southeastern Drilling Corporation, Dallas.

Dr. Pierre Rinfret, vice president and director of the economic department of Lionel D. Edie & Company, Inc., will speak on "The Oil Industry—Forecast of Economic Conditions and Capital Expenditures."

Friday morning's session will include a panel discussion of "Things to Come in Drilling and Production."

The final general session will be devoted to drilling technology with M. G. Rowe, president of Rowan Drilling Company, Inc., Fort Worth, and program chairman of the AAODC annual meeting, presiding.

Oilwell blowouts will be the subject of two sections of the three-part program. First speaker is Frank J. Whitley, BBM Drilling Company, Houston, who will review the new AAODC-American Petroleum Institute training program on "Prevention and Control of Blowouts."

"Development of Blowout Control Devices" will be discussed in a paper co-authored by J. E. Ortloff of Jersey Production Research Company, Tulsa, and W. E. Harrelson, Creole Petroleum Company, Tia Juana, Venezuela.

Frank J. Whitley, BBM Drilling Company, Houston, was chairman of the 44-man advisory committee that worked on the course for more than a year.

Whitley will review the course, which will be presented initially to toolpulshers and other supervisory drilling personnel, at a general session of the AAODC's eighteenth annual meeting in Dallas October 1-3.

Complete course was scheduled for presentation in Lafayette, Louisiana September 23-24 and in Odessa, Texas, during October.

Coastal-Marine V-P Chosen Chairman for AIME Meet

I. W. Alcorn, vice president and general manager of Coastal-Marine Drilling and Construction Corporation, Houston, will preside as honorary chairman for the 33rd Annual Fall Meeting of the Society of Petroleum Engineers of AIME in Houston October 5-8.

Sixty-five technical papers will be given at sessions covering economics and valuation, reservoir engineering, well completion, production operations, oil recovery processes, logging,

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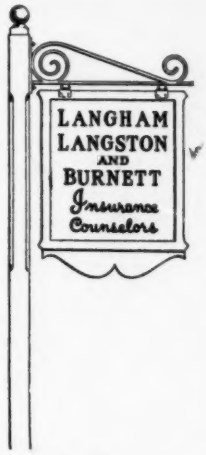

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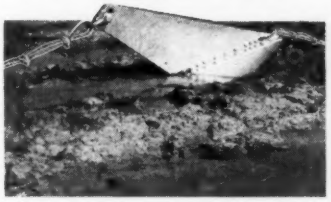

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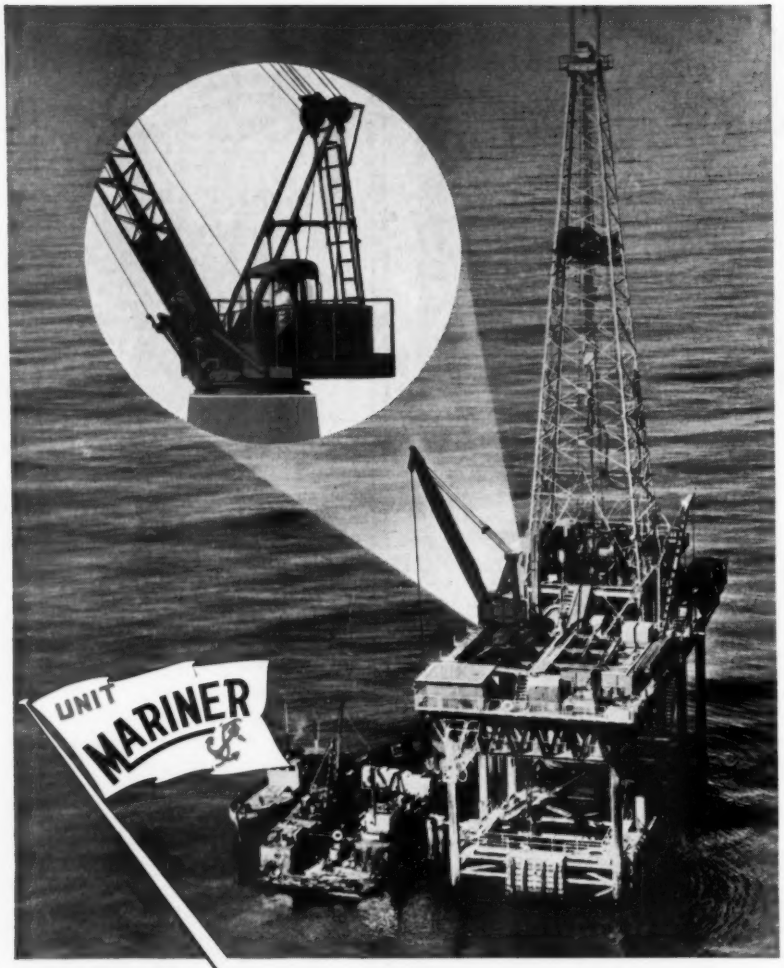

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Industry Items . . .

(continued from preceding page)

drilling and production research. Two thousand petroleum engineers are expected to attend.

One feature will be presentation of the John Franklin Carll Award to Col. Ernest O. Thompson of the Texas Railroad Commission.

Joint recipients of the Cedric K. Feguson Medal will be Jim Douglas, Jr., P. M. Blair, and R. J. Wagner, co-authors of the technical paper, "Calculation of Linear Waterflood Behavior Including the Effects of Capillary Pressure."

Tidewater Names Kelliher To Southern Region Office

Thomas G. Kelliher has been named Southern Division assistant general manager of Tidewater Oil Company, to fill the vacancy left by the recent promotion of Lloyd Armstrong, who was named a vice president in Tidewater's Central Division offices in Tulsa.

Kelliher

Formerly manager of exploration for the company's Southern Division, Kelliher has been with Tidewater 23 years.

Last summer, he was elected national president of the American Association of Petroleum Landmen. He is also a member of the Houston Geological Society, Mid Continent Oil and Gas Association, Houston Landmen's Club, American Petroleum Institute and other organizations.

Loffland Brothers Names Price European Operations Manager

W. J. Price has been appointed manager of European operations for Loffland Brothers Company, Tulsa, Oklahoma.

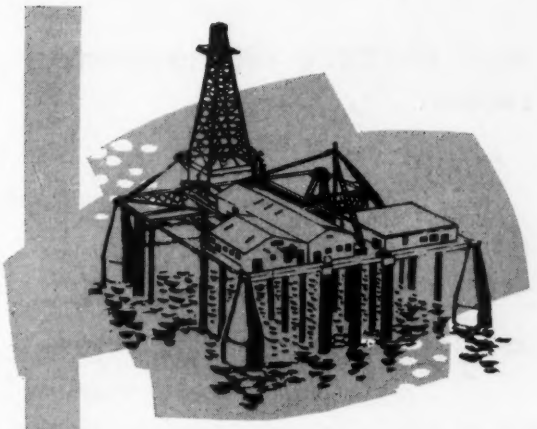
Price

He formerly served with Loffland Brothers as foreign contract representative, devoting much of his time to the Mediterranean area. His new office will be in The Hague, Holland.

Price graduated from the University of Oklahoma in 1931 with a degree in Petroleum Engineering. During World War II, he served as a captain in the U. S. Army Corps of Engineers.

Mobile Units, Tenders, And Self-Contained Platforms Gulf Coast Area

OWNER	NAME	WATER DEPTH	PRESENT STATUS
Barnwell Offshore, Inc. Self-elevating 176' x 176' x 152' with three 145' legs	"Mister Cap"	To 100'	Drilling for Sinclair-Sohio, Block 190, Eugene Island Area
Blue Water Drilling Corp. Submersible	Rig No. 1	70'	Drilling in Block 78, Vermilion Area, for Austral Oil
The California Company Submersible 11' x 90' x 156' with four 3' x 10' x 35' pontoons	S-45		Bay Marchand, La., Rowan Drilling Co., contractor
The California Company Submersible 12' x 90' x 190', with four 4' x 24' x 50' pontoons	S-55		Bay Marchand, Louisiana, Noble Drilling Company
Continental Marine Exploration Co. Submersible 230' x 99' with 54' between fixed hulls	"M & H" Drilling Platform No. 12"	To 30'	Drilling for Fish Northwest Constructors, Inc. Block 154, Texas
Coral Drilling Company Submersible 180' x 151' x 84' with four pontoons	"Mr. Arthur"	To 70'	Drilling in Block 26, Grand Isle Area for California Company
Deepwater Exploration Co. Self-elevating overall 121' x 118'	"Deepwater No. 2"		Completely salvaged unit at LeTourneau, Vicksburg yard
Delta Marine Drilling Co. Submersible	"Chris Zeppa"	To 35'	Stacked
Dixilyn Drilling Corp. Self-elevating 194' x 152' overall. Three 175' legs	"Julie Ann"	To 105'	Stacked Waiting on location Block 20, Timbalier Bay Area
C. G. Glasscock Drilling Co. Self-elevating. Deck 258' x 104', pad 200' x 180' with four 10' dia. columns	"Mr. Gus II"	150'	On location, Block 208, Eugene Island Area. Working for CATC Group in 92-ft. of water
Gulf Marine Drilling, Inc. Submersible	Rig No. 1	30'	Drilling La. State Lease 1483 for Gulf
Kerr-McGee Oil Ind., Inc. Submersible 13' x 54' x 160' with two 13' x 14' x 110' pontoons	Rig 40	To 20'	Waiting on Location, Eugene Island Area
Kerr-McGee Oil Ind., Inc. Submersible 134½' x 72' x 140' with two 134½' x 134½' x 140' pontoons	Rig 44	To 40'	Waiting on location
Kerr-McGee Oil Ind., Inc. Submersible 142' x 69' x 13'6", with two 10' x 11' x 146' pontoons	Rig 45	To 35'	Waiting on location
Kerr-McGee Oil Ind., Inc. Submersible	Rig 46	To 70'	Waiting on location
Kerr-McGee Oil Ind., Inc. Submersible	Rig 47	To 70'	Drilling for Phillips Petroleum Company, Block 40, West Cameron Area.
Louisiana-Delta Offshore Corp. Submersible 180' x 151' x 12'	Drill Barge Louisiana	To 65'	Working for Shell Oil Company
Louisiana-Delta Offshore Corp. Submersible 156' x 90'	Drill Barge Delta	To 25'	Waiting on location
Magnolia Petroleum Co. (Drill barge on piling)	Rig 52		Out of service
Marine Drilling Inc. Submersible 12' x 74' x 200' with four fixed pontoons	"101"	To 45'	Waiting on location, Timbalier area
Movible Offshore Co. Robert Macy Design 201' x 211' x 110'	"Movible No. 2"	To 80'	Drilling for John W. Mecom, West Cameron Area
Noble Barge Co. Twin-hull submersible 217' x 100'	"Lloyd Noble S-66"	To 100'	Being built at Avondale Marine Ways



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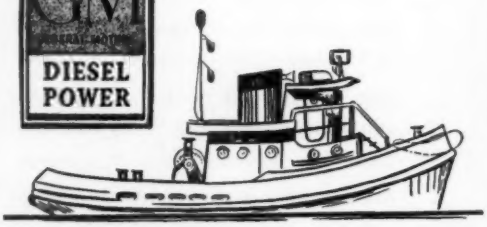

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Ocean Drilling & Exploration Company Submersible 200' x 300' x 98'	"El Dorado"	To 70'	Drilling for CIMA, Gulf of Campeche, Mexico
Ocean Drilling & Exploration Company Submersible 132' x 220' x 58'	"Mr. Charlie"	40'	Under repair, Alabama Dry Dock and Shipbuilding Co., Mobile, Alabama
Ocean Drilling & Exploration Company Submersible 120' x 180' x 49'	"John Hayward"	30'	Drilling for self, et al. Block 9, East Cameron Area
Ocean Drilling & Exploration Company Submersible 200' x 300' x 93'	"Margaret"	To 60'	Drilling for Shell, Block 27, South Pass
Ocean Drilling & Exploration Company Submersible 120' x 180' x 50'	"St. Louis"	To 30'	Drilling for Shell, Block 27 South Pass Area
The Offshore Company Self-elevating 81½' x 70' x 203' with twelve 6' dia. caissons	Mobile Unit No. 51		Bayou Bouef Louisiana
The Offshore Company Self-elevating 131½' x 117' x 220' with fourteen 6' dia. caissons	Mobile Unit No. 52		Block 129-A, Eugene Island Area
The Offshore Company Submersible 12' x 74' x 200' with four 6' dia. caissons	Mobile Unit No. 53		Cameron Area
The Offshore Company Self-elevating 200' x 104' x 15' with eight 12' dia. towers	Mobile Unit No. 54		Block 63, S. Timbalier Area
The Offshore Company Self-elevating 200' x 104' x 15' with eight 12' dia. towers	Mobile Unit No. 55		Panama
The Offshore Company Self-elevating	Mobile Unit No. 56		Under Construction by American Bridge, Orange, Texas
Penrod Drilling Company Submersible 196' x 108'	Rig 50	44'	Eugene Island Area
Penrod Drilling Company Submersible 150' x 190'	Rig 51	To 70'	On location in Bay Marchand Area
Penrod Drilling Company Submersible 198' x 174'	Rig 52	100'	Eugene Island Area
Placid Oil Co. Twin submersible hulls, each 72' x 178'	Unnamed	To 100'	Built by Levingston Commissioned May, 1958.
Reading & Bates Offshore Drilling Company Self-elevating	"C. E. Thornton"	To 90'	Drilling for Gulf Oil Corporation Well No. 4, Block 21, South Timbalier Area
Rimrock Tidelands, Inc. Submersible	"Rimtide"	To 35'	Completed in May, 1958. Waiting on location
Sea Drilling Corp. Submersible	"Seadrill 2"	30'	Waiting on location Galveston Bay
Sea Drilling Corp. Submersible	"Seadrill 3"	30'	Waiting on location, Terrebonne Bay
Southeastern Drilling Corp. Submersible 11' x 90' x 156' with four pontoons	Rig 22, Barge 8		Drilling for The Texas Company, Southwest Marsh Island
Trans-Gulf Offshore Drilling, Inc. Self-elevating	"Trans-Gulf No. 10"	75'	Christened March 7 at Adams Terminal, Houston, Texas
Union Producing Co. Submersible 160' x 190'	Unnamed	To 76'	Under construction at Todd Shipyards Corp., Houston
Universal Drilling Company Self-elevating	"Mr. Louie"	To 130'	Under construction by Port Houston Iron Works
Zapata Off-Shore Company Self-elevating. 194' x 152' overall. Three 145' legs	"Vinegaroon"	To 80'	At Galveston waiting on location
Zapata Off-Shore Company Self-elevating. 20' x 80' x 140', with three triangular legs	"Scorpion"		On location Cay Sal Bank, Bahamas

Drilling Tenders

OWNER	NAME	WATER DEPTH	PRESENT STATUS
An-Son Offshore Drilling Co.	"Carl B. Anderson"		Block 27, Bay Marchand
The California Company Converted LST, 328' x 50'	S-21	22'	Bay Marchand, Louisiana, Noble Drilling Company
The California Company Converted LST, 328' x 50'	S-22	49'	Grand Isle Area Loffland Brothers
The California Company Converted LST, 328' x 50'	S-23	45'	South Timbalier Area, Noble Drilling Co.
The California Company LST, 328' x 50'	S-24	37'	West Delta Area, Louisiana, Noble Drilling Co.
The California Company LST, 328' x 50'	S-25	39'	West Delta, Louisiana, Loffland Bros. rig
The California Company LST, 328' x 50'	S-26	23'	Shut down. Dry docked. Loffland Bros. rig
Coastal-Marine Drilling and Construction Corp. New tender, 272' x 56'	Howard S. Cole Jr. Coastal-Mariner No. 1		Stacked
CATC Group New tender, 260' x 54'	"J. C. Craig"	50'	Drydock
CATC Group New tender, 260' x 54'	"Carle Sharp"	72'	Drydock
CATC Group New tender, 260' x 54'	"Ernie Miller"	50'	Drydock
CATC Group New tender, 260' x 54'	"Jack Cleverley"		Drydock
Deepwater Exploration Co. Converted LST, 328' x 50'	"Deepwater No. 1"		Block 174, Ship Shoal
Delta Marine Drilling Co. Converted LST, 326' x 50'	"Joseph Zeppa"	42'	Stacked
Gulf Oil Corporation New tender	"Dolphin"		Completed, placed in moth ball fleet at Orange, Tex., engines pickeled, and rig stacked
Gulf Oil Corporation Converted LST, 328' x 50'	"Eagle"	118'	Rig stacked at Morgan City, Louisiana
Gulf Oil Corporation New tender, 272' x 60'	"Pelican"	136'	Rig stacked at Morgan City, Louisiana
Humble Oil & Refining Co. Converted LST, 328' x 50'	ST-1	50'	Standing by
Humble Oil & Refining Co. Converted LST, 328' x 50'	ST-2	40'-50'	Standing by
Humble Oil & Refining Co. Converted LST, 328' x 50'	ST-3	60'-65'	Standing by
Humble Oil & Refining Co. Converted LST, 328' x 50'	ST-4	40'-50'	Standing by
Humble Oil & Refining Co. Converted LST, 328' x 50'	ST-5	40'-50'	At Orange, Texas for storage
Humble Oil & Refining Co. Converted LST, 326' x 50'	ST-6	40'-50'	Standing by
Humble Oil & Refining Co. Converted LST, 328' x 50'	ST-7	50'	Standing by
Humble Oil & Refining Co. Converted LST, 328' x 50'	ST-8	60'-65'	Standing by
Humble Oil & Refining Co. Converted LST, 328' x 50'	ST-9	40'-50'	Standing by
Humble Oil & Refining Co. Converted LST, 328' x 50'	ST-10	40'-50'	Standing by
Humble Oil & Refining Co. Converted LST, 328' x 50'	ST-11	40'-50'	Standing by
Humble Oil & Refining Co. Converted LST, 328' x 50'	ST-12	45'-60'	South Timbalier Area

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OWNER	NAME	WATER DEPTH	PRESENT STATUS
Kerr-McGee Oil Ind., Inc. Converted YF, 260' x 48'	"Kermac I" Rig 16		Waiting on Location
Kerr-McGee Oil Ind., Inc. New Tender, 250' x 50'	"Kermac II" Rig 43		Waiting on location
Kerr-McGee Oil Ind., Inc. New Tender, 250' x 50'	"Kermac III" Rig 48		Waiting on location
Kerr-McGee Oil Ind., Inc. Converted YF, 260' x 48'	"Frank Phillips" Rig 39		Waiting on location
Llano Drilling Company New tender, 260' x 54'	"Clayton G. Dorn"		In Drydock Orange, Texas
Magnolia Petroleum Co. (Converted YF)	"Gulf Coast Barge No. 2"		Out of Service
MCN Group Converted YF	MDT-1		Block 66, East Cameron Area, Well A-1 drilling
MCN Group Converted YF	MDT-2		Out of Service
MCN Group Converted YF	MDT-3		Out of Service
MCN Group Converted YF	MDT-4		Out of Service
MCN Group Converted YF	MDT-5		Out of Service
MCN Group Converted YF	MDT-6		Out of Service
MCN Group Converted YF	MDT-7		Block 72, Ship Shoal Area, Well H-2; drilling
Pan American Petroleum Corp. Converted LST, 328' x 50'	"Pan American 50"		Orange, Texas
Phillips Petroleum Company Converted YF, 260' x 48'	"K. S. Adams" Rig 40	24'	Inactive
Reading & Bates Offshore Drilling Company	"J. W. Bates"	60'	Drilling for CATC, Block 123, Vermillion Area
Reading & Bates Offshore Drilling Company	"George M. Reading"	60'	Drilling for Shell Oil Co., Block 175, Eugene Island Area
Southeastern Drilling Corp. Converted YF	Rig 12, Barge 9		Shut down, Industrial Canal, New Orleans, Louisiana.
Zapata Off-Shore Company Converted YF, 260' x 48'	"Nola No. 1"	16'	At Galveston, waiting on location

Self-Contained Platforms

COMPANY	DESCRIPTION	YEAR BUILT	LOCATION	WATER DEPTH
Brewster Bartle Off-Shore Co.			Block 30, West Delta	50'
CATC Group	110' x 146'	1956	Block 40, Grand Isle	82'
CATC Group	110' x 146'	1956	Block 45, West Delta	50'
CATC Group	110' x 146'	1957	Block 47, Grand Isle	88'
CATC Group	110' x 146'	1957	Block 45, West Delta	50'
CATC Group	110' x 146'	1957	Block 48, Grand Isle	97'
Dixilyn Drilling Corp. Rig #7	120' x 145'	1956	Rig removed and in storage at Dupont's Bayou Bouef yard	
Forest Oil Corp.			Block 4, E. Cameron, Gulf Marine Drilling Inc. (power-package rig)	
Gulf Oil Corporation	40' x 100'	1957	Rig Stacked at Morgan City, La.	

COMPANY	DESCRIPTION	YEAR BUILT	LOCATION	WATER DEPTH
Humble Oil & Refg. Co. Rig # 50	78' x 200'	1956	J Platform, Block 16, Grand Isle Area	50'
Humble Oil & Refg. Co. Rig # 54		1958	B Platform, Block 54, South Timbalier Area	
Mecom Petroleums	82' x 193'	1948	Rig removed from platform	34'
Phillips Petroleum Co.	85' x 140'	1955	Block 184, Eugene Island Area, vacated, platform remains	84'
Phillips Petroleum Co.	88'9" x 140'	1955	Block 129-A, Eugene Island Area, La. Platform Inactive	52'
Phillips Petroleum Co.	88'9" x 140'	1956	Block 172, Eugene Island Area. Vacated platform	77'
Phillips Petroleum Co.	88'9" x 140'	1956	Block 191, Eugene Island. Platform Inactive	81'
Phillips Petroleum Co.	88'9" x 140'	1957	Block 129, Eugene Island Area. Platform Inactive	57'
Pure Oil Company Converted LST	328' x 50'	1958	Orange, Texas	
Pure Oil Company	52' x 106' with 51' x 82' pipe rack	1957	Well completed, rig removed	72'
Shell-Humble	115' x 135'	1958	Block 188, Eugene Island Area	68'
Shell Oil Company	115' x 135'	1958	Block 192, West Cameron Area	56'
Shell Oil Company	55' x 110'	1958	Block 176, Eugene Island Area	86'
Sinclair Oil & Gas Co.	112' x 133'	1956	Rig removed, (converting to production platform)	92'
Sinclair Oil & Gas Co.	118' x 142'	1957	Block 175, Eugene Island Area, Rimrock Tidelands, Contractor	85'
Sinclair Oil & Gas Co.	118' x 142'	1957	Rig removed (conversion complete)	72'
Sinclair Oil & Gas Co.	118' x 142'		In storage at McDermott Bayou Bouef yard	
Sinclair Oil & Gas Co.	80' x 180'	1955	Block 15, South Timbalier Area no rig in operation	7'
Sinclair Oil & Gas Co. (L Shaped)		1955	Block 175, Eugene Island Area	87'
The Superior Oil Co.	138' x 326'	1955	B-6, Block 71 West Cameron Area, Completed 6-20-58.	
The Superior Oil Co.	96' x 225'	1958	B-1 Vermilion Block 76, Drilling at 10,685' in Side-track hole.	

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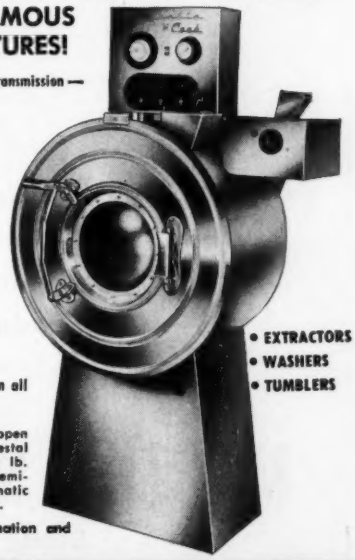

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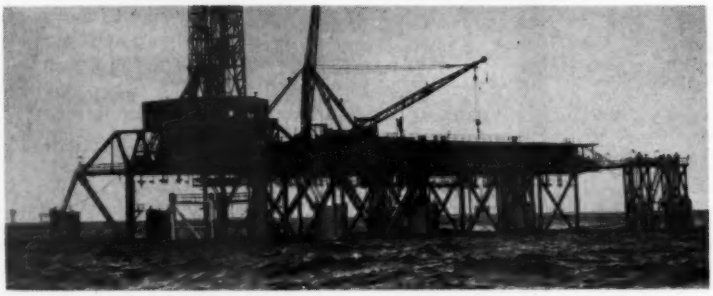

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(continued from Page 41)

CP-Harrisburg, Inc.; Dorris Balew, Inc.; Cummins Sales & Service, Inc.; Cummins Sales & Service de Venezuela, C.A.; and Pioneer Well Services, Ltd.

Vice president of Kendavis Industries is Ken Davis, Jr., who is also comptroller. Other officers include Thomas N. Shults, general vice president; Victor LeMay, vice president, communications; John W. Tullis; vice president, manufacturing; R. J. Bromell, vice president, drilling; P. Z. Hilliard; vice president, merchandising; and Dan D. Rogers, vice president, traffic.

Venezuela

Creole Begins Fourth Unit To Re-inject Maracaibo Gas

Creole Petroleum Corporation is building its fourth big facility for injecting natural gas back into the vast oil pools underlying Lake Maracaibo. The company's third plant, Tia Juana No. 3, which will put about 300 million cu. ft. of gas per day back into the oil zones is scheduled for completion by the year's end.

Upon completion of the fourth unit, which will inject 145 million cu. ft. per day to boost oil recovery, Creole will be able to re-inject 888 million cu. ft. per day.

Newest plant is about 4.5 mi. offshore from Tia Juana and is to be completed in one and a half years.

Cameron's Composite Trees Make Lake Maracaibo Debut

Ordering of six composite christmas trees for use in Lake Maracaibo by Cia. Shell de Venezuela indicates the new type tree may be a coming thing in the lake.

Manufactured by Cameron Iron Works, Houston, the composite trees combine the gin-pole socket, wing valve, choke box, flow-line valve, master valve, flow valve and swabbing valve in a single casting that takes up only about 20 percent as much space as conventional trees.

Present models are built for a working pressure of 3000 psi, but Cameron will probably use steel forgings to build higher pressure models when the need arises.

Cia. Shell thinks the unit may solve the problem of vessels colliding with well heads because the well head can be covered with a small steel jacket and flow line can fit snug against the casing all the way to the bottom of the lake.

Recap on Tidelands

IN THE
Supreme Court of the United States
OCTOBER TERM, 1958

UNITED STATES OF AMERICA,
Plaintiff,
v.
STATES OF LOUISIANA, TEXAS, MISSISSIPPI, ALABAMA and FLORIDA
Defendants.

Hearing starts October 13th—States not optimistic

By ORVILLE SCOTT
Managing Editor

THE tidelands issue will soon be settled—and everyone involved will breathe a sigh of relief.

This very simple and basic issue has been used as a political football for several decades.

It has apparently made liars of some of our top political leaders—one successful candidate for the presidency of the U. S. emphatically promised the states unstinting support when he was running for office.

But that's politics, and everything that stands athwart the juggernaut drive of the Washington cocktail gang to exercise paramount power over states, water, air and ground is bound to come out second best.

Oil rich tidelands beyond three mi. at sea will await the winner when the Gulf Coast states of Texas, Louisiana, Mississippi, Alabama and Florida match legal wits with the federal government in the U. S. Supreme Court October 13. Attorneys have been allowed thirteen hours to present their arguments.

In the original complaint filed by the Department of Justice in December, 1955, only Louisiana was named as defendant. After the case was submitted to the Supreme Court in April, 1957, however, the State of Texas sought permission to file a brief as *amicus curiae* in which it asked the Court to decide the case in a way that would not prejudice its claim.

The Court then granted permission to all the Gulf Coast states to enter the case. Only Alabama accepted, but the United States brought in Texas, Mississippi, Alabama and Florida.

What's at stake . . . A leading geologist estimates that in the vast submerged region off Texas and Louisiana there are undiscovered reserves totaling 30 billion bbls. of oil and 240 trillion cubic ft. of gas.

Off Louisiana, alone, there are nearly two million acres within the disputed zone, and if the line were extended to the edge of the Continental Shelf, it would embrace many additional millions of acres of prospective oil lands.

Since the beginning of offshore production about ten years ago, geologists estimate that about 1.5 billion bbls. of proven oil reserves and nearly 20 trillion cubic ft. of gas have been tapped by the drill bit.

Although the three other Gulf Coast states have yet to see offshore oil production, the exploration area embraced by their three-league boundary is a worthy prize. Estimated value of all Gulf oil lands is $52 billion.

In addition, the victor will carry off the escrow purse—which in the case of Louisiana amounts to about $55 million.

States claim . . . Defendant states claim in a joint brief filed with the Court August 15, 1958, that the Submerged Lands Act gave them title to submerged lands and natural resources out to their "historic" boundaries. These boundaries, they declare, are not limited to three mi. at sea.

They go on to say that if international law is to be used in arriving at a decision, it further verifies the states' rights to a three-league boundary.

Louisiana, Florida and Texas claim their "historic" boundaries extend out to the three-league mark, but Alabama and Mississippi declare a six-league boundary.

Texas claims . . . Attorneys for the State of Texas will contend that Texas had a three-league boundary while it was yet an independent nation. This boundary, they declare, came with it when it entered the union and has often been recognized by Congress.

Louisiana claims . . . Principal claims set forth by Louisiana in a separate brief from that filed by all five states are:

1) The Submerged Lands Act confirms and recognizes state title to submerged lands and natural resources within "historic" boundaries.

2) Louisiana's Act of Admission fixes the seaward boundary of the state at three leagues from the coast.

3) The United States has fixed the national boundary at three leagues in the Gulf and all state boundaries are co-extensive with the national boundary.

4) The Louisiana coast has been defined by the U. S. Coast Guard,

(continued on next page)

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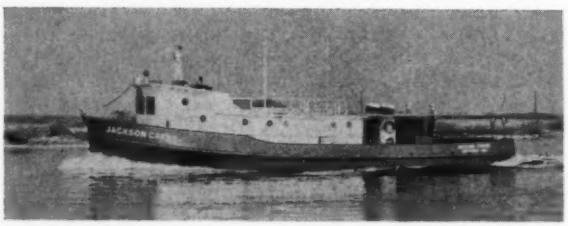

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Tidelands . . .

(Continued from preceding page)

pursuant to congressional authority, as the line dividing inland waters from the open sea.

The United States Government denies all claims of the states, and its attorneys headed by Solicitor General J. Lee Rankin will be out to prove that the state boundaries did not extend more than three mi. seaward at the time of admission to the Union.

What will happen if U.S. wins . . . Chances are the Supreme Court will follow its original ruling that a state boundary cannot exceed the national boundary and rule in favor of the federal government.

At least one of the defendant states has indicated that it feels the Court will favor the U. S. Last summer, Attorney General Will Wilson of Texas said the state should not expect to win outright a claim to a 10.5-mi. seaward boundary. He said Texas might revise its original strategy and seek exploit rights over the disputed region.

As far as the oil industry is concerned, a decision for the federal government would mean little change in the current mode of discovering and producing oil in the Gulf of Mexico.

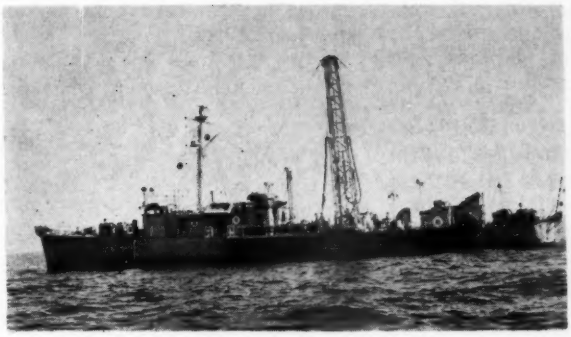
The offshore operator could hardly expect a change in his biggest problem, inadequate allowables, inasmuch as the federal government has always left that up to the adjoining states anyhow.

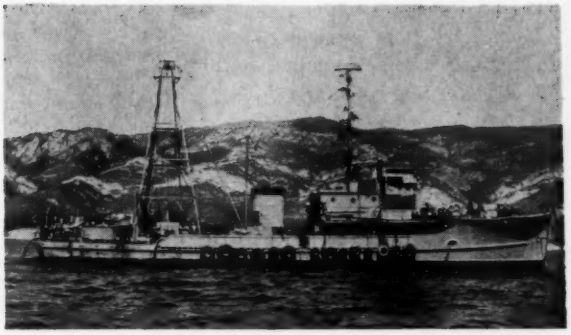
What oil operators think . . . The oil industry is keeping quiet about the issue. Most operators have always been content with "getting the thing settled so we will know who to lease from."

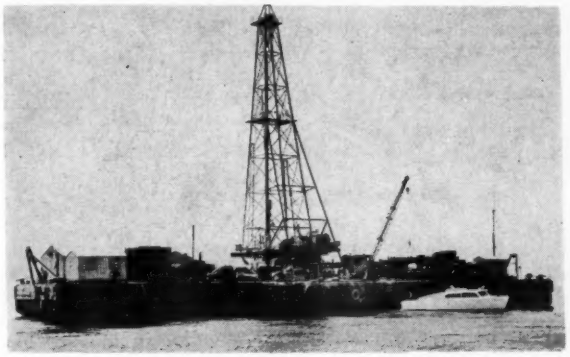
Perhaps, if there is any feeling, it is expressed in a speech delivered recently by Morgan J. Davis, president of Humble Oil and Refining Company:

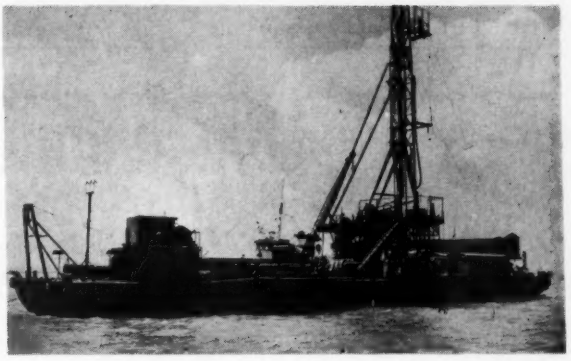
"My own company, I know, has found that it can usually look forward to more efficient operation and fewer frustrating delays when acting as the lessee of states and private owners than as a lessee of the Federal Government.

"A state and an oil company both work on the local level. They share a greater mutuality of interests, a better understanding of each other's problems."









ALL OF THESE VESSELS have drilled at sea—two in the Gulf of Mexico and two off California where one such vessel drilled exploratory core holes as early as 1953.

Drilling From a Floating Vessel

(First of a Series)

FROM the array of pictures above, it is obvious that it is now possible to drill holes from floating vessels—in deep water. As a matter of fact, the CUSS Group (Continental Oil Company, Union Oil Company of California, Shell Oil Company and Superior Oil Company) recently drilled a 6300 ft. deep hole from the **CUSS I** in 1500 ft. of water off the California coast.

Why then aren't operators preparing to venture farther out into the deeper water in the Gulf of Mexico? What are the problems, and how can they be solved?

OFFSHORE editors have asked these questions of offshore oil industry leaders, and as a result, we have been flooded with excellent editorial material which will be presented in two parts, the bulk of which will appear in the November issue.

As most OFFSHORE readers know, some 32—1500-ft. core holes have been drilled off Galveston; at the same time, it is an open secret that at least one floating rig is drilling experimental holes near Trinidad.

Also, much engineering thought is going into solving this problem—almost every major company has made tentative designs of equipment that can be used for drilling and completing wells on the floor of the ocean.

As a matter of fact, one has even developed a technique for working over wells through flow lines. This technique could certainly be an important factor in well maintenance once the industry sets out on this course of action.

Problems to Be Overcome in the Gulf

By DR. WILLIAM C. TRIPLETT

President, Sea Mole, Inc.

Why aren't floating drilling vessels operating in the Gulf of Mexico? As one of the companies working on designs for offshore floating drilling equipment, Sea-Mole, Inc. is certainly in an excellent position to answer this particular question.

First, it should be pointed out that there has already been a limited amount of drilling from floating vessels in the Gulf. Core drilling for sulphur has proved successful in a number of instances, and recently one company drilled a number of exploratory core holes aimed at verifying seismograph work. The technique used was quite simple: a conventional land rig was mounted on the side of a barge, and drilling methods were essentially the same as those on land with the exception that several bumper jars were run

(Continued on next page)

Floating Drilling . . .

(Continued from preceding page)

in the drill string to compensate for the movement of the vessel in the seas.

Off California, drilling from floating vessels has been more extensive and carried out with little or no difficulty. However, no completion of producing wells has been attempted.

Considering the success of this type of drilling, why is the process not being utilized in Gulf of Mexico leases?

There are two major hurdles. First, there is the difficult problem of winning the approval and acceptance of offshore operators. The method is new and different; and initially, it will require a certain amount of venture capital with no guaranteed returns on investments.

Second, the actual technical problems are by no means minor. Here are four of the most important ones:

1. The seas, currents and winds peculiar to the Gulf of Mexico.

2. The unconsolidated bottoms usually found off the coast of Louisiana.

3. The very serious hazard of high pressure formations. This requires the utmost in positive, safe blowout control.

4. An adequate, proven method of underwater, remotely controlled completion.

As long as conventional rigs have been, available, the natural trend has been to utilize the known methods of rotary drilling, adapting these techniques to offshore drilling with bay-type barges, platforms, and finally, the mobile platform.

Although these methods were not economical and were limited to moderate depths of water, these rigs were used to make hole fast and to prove the expensive leases, no matter what the cost. From 1946 to 1954 work of this type was available for nearly any contractor who wished to try his hand in the Gulf.

With this obvious lack of real competition, contractors and operators were, quite naturally, reluctant to put up the capital and take the risks involved with a relatively untried method of drilling. However, most have recognized that eventually technical inability to develop the far offshore leases and the definite economical advantages of floating drilling would force them to utilize this method to stay in business.

Technical problems have imposed the other major deterrant to floating drilling. Sea-Mole has spent twelve years studying these problems and has finally found acceptable answers to them. The actual technique of drilling from a floating vessel has proved successful where it has been applied. When it is used in the Gulf however, unique methods of anchoring the vessel and converting the motions induced by wind and wave are necessary.

The unconsolidated bottom is an additional hazard which requires more surface casing, improved cementing, and, in many instances, a buoyant base for the submerged wellhead assembly.

High pressure formations equal to, or more severe than, those found onshore are known to exist in offshore Gulf leases. Obviously the most stringent precautions for blowout control are necessary. At no time can the bore be left open, as is possible off California.

Sea-Mole has engineered a technique using conventional blowout preventers, both bag and ram type, coupled with remotely controlled downhole packers which fully meet the requirements for positive con-

(Continued on next page)

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(Continued from preceding page)

trol, plus ability to continue circulation if desired.

As an added safety feature, we have developed in conjunction with the McEvoy Company of Houston, remotely controlled access lines to the casing annuluses for as many strings as are needed.

Sea-Mole feels that the value of floating drilling is increased by the use of remotely controlled submerged completion methods. Again working with the McEvoy Company, this technique has been engineered successfully.

Thus, a well can now be drilled, controlled, and completed in the Gulf of Mexico, utilizing floating drilling techniques which are cognizant of and engineered for the problems peculiar to this body of water.

Humber Oils Takes Search Onto Great Barrier Reef

Taking a look at the more than $100 million which have been spent in Australia for oil exploration without commercial success, a Canadian firm has decided to try its luck offshore.

Humber Oils Limited, Calgary, Canada, plans to begin drilling operations from Wreck Island on the Great Barrier Reef next April after aerial photographic surveys have been conducted to determine significant patterns in the reef trends and shapes.

Purpose of the well is to determine whether there are sediments of a type which give rise to oil accumulation.

For the drilling, a T32 rig owned by Mines Administration Pty. Ltd. of Brisbane, Queensland and capable of drilling to 6000 ft. will be transported to Wreck Island on a LST landing craft.

There, a beach landing will be made and materials and equipment hauled ashore with trucks and a bulldozer.

Humber believes prospects of the Great Barrier Reef are somewhat different from those of so far oilless Continental Australia to the west.

The reef takes in about 100,000 sq. mi.—1200 mi. long and a maximum of 180 mi. wide—and Humber has about three-quarters of the area under permit.

"In searching for oil there, we are looking for two or three marine basins of the type that occur in California," said A. W. Nauss, president.

Offshore Problem Answered With Anti Freezing System

New equipment installed by Shell Oil Company to prevent freezing of lines in East Cameron Block 17 field may be the answer to one of the toughest problems of offshore gas producers.

The new anti freezing system operates by simply separating the gas, water and condensate at each well platform. A heat exchanger, low-temperature vessel and free water knockout vessel were installed on each production platform.

In the beginning the unseparated mixture passes through heat exchanger and free water knockout vessels. At the entrance to the low-temperature vessel, temperature is lowered until the water drops out. Then the gas and condensate are recombined and piped to shore through a 12-in. line.

Prior to taking the new equipment to sea, Shell mounted it on well jacket extensions. There are some 16,000 ft. of three-in. flowline among the installations.

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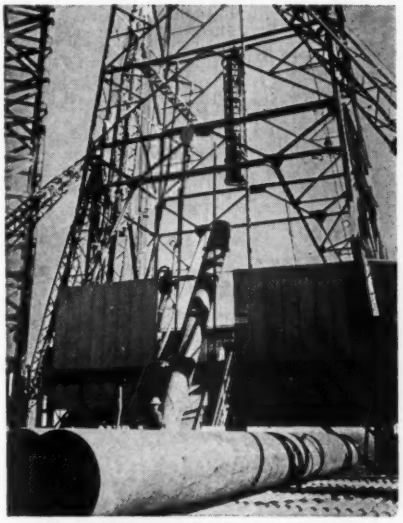

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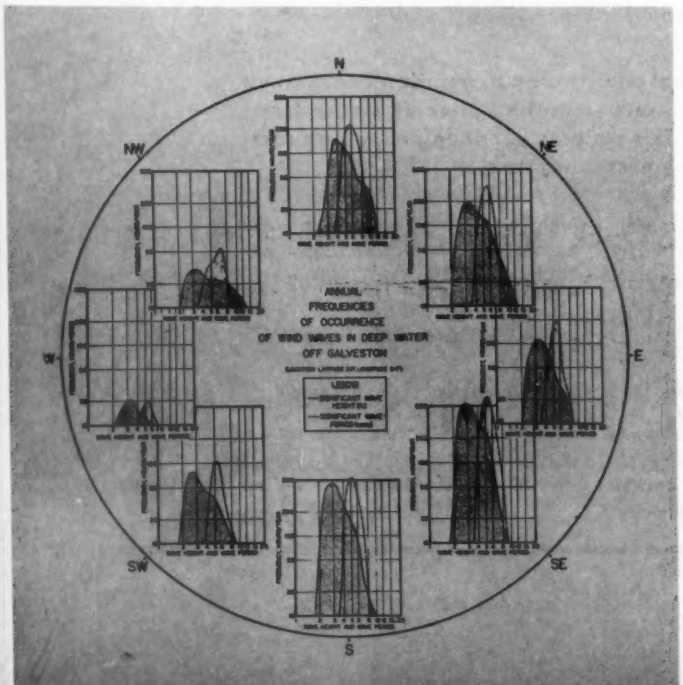
VICTIM OF THE GULF, Mr. Gus I, $3.5 million mobile drilling platform, lays on its side off the coast of Texas. A stark answer to the question . . .

How Rough Are Waters of the Gulf?

What you can expect in wave heights in gales, squalls, hurricanes, etc.

by DR. BASIL W. WILSON
Associate Professor of Engineering Oceanography
A. & M. College of Texas

THE GULF of Mexico is virtually an enclosed basin and this fact along with its location in respect to the world weather system largely dictates the extent to which its surface waters can be fuffled. It is well known that the height to which waves can be generated by the wind is a function of the magnitude of the wind velocity, of its duration and of the fetch or tract of water over which it plays. Since the fetch is limited by the dimensions of the Gulf and the wind velocity restricted to the circumstances of the weather there are obvious limits to the size of waves that can be encountered in the area. An additional factor in the picture is the influence of bottom friction when the waves reach the shallowing water over the submerged continental shelf. The slopes of the shelf in the Gulf of Mexico are particularly gradual, so that attrition effects from friction play an important role in the dissipation of wave energy along the coasts.

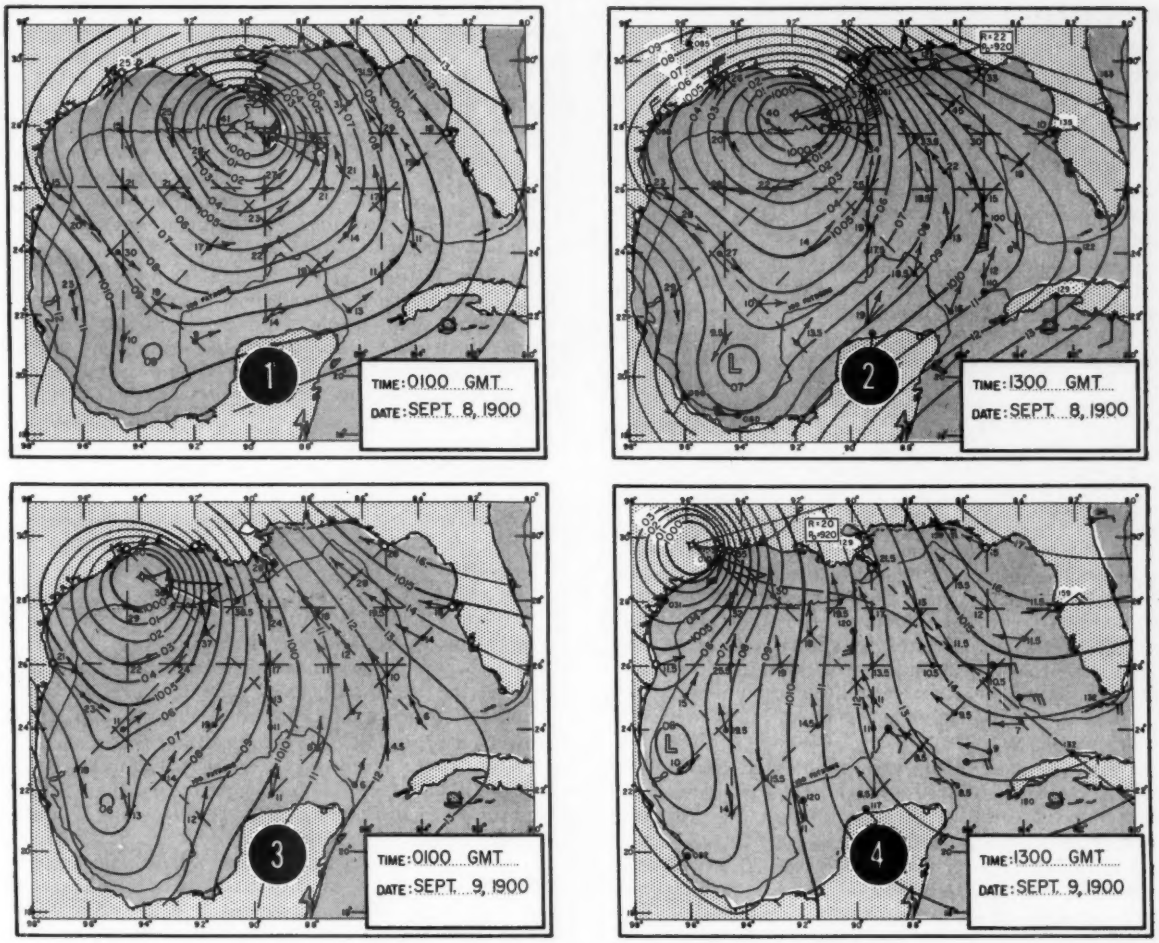


WAVE ROSE gives Frequencies of Occurence of Wind Waves of Particular Heights and Periods from Principal Directions at Deep-Water Offshore Station near Galveston. Fig. 1.

"Normal" Weather and It's Effects

To understand the general situation it is necessary to discuss briefly the trends of the weather regime. The Gulf of Mexico, being south of 30° N latitude, lies in the belt of the north-east trade winds and in summer experiences prevailing easterly winds which, on gaining the western reaches of the Gulf, are deflected northwards by the Mexican highlands and the overlying atmospheric pressure pattern. The overall effect of this on the northern coastline of the Gulf is an almost constant easterly or southerly flow of air into the Mississippi basin and Great Plains regions. In winter a quasi-stationary high pressure system develops over the western portion of the North American land mass and from the north-eastern side of this at intervals of 5 to 7 days frontal storms created by infusions of cold polar air penetrate south-eastward and reverse the air flow from the east and south, already weakened by withdrawal of the belt of tropical air movement toward the Equator. The cold fronts, familiarly known as "northers", sweep out over the Gulf, backed by northerly winds, which

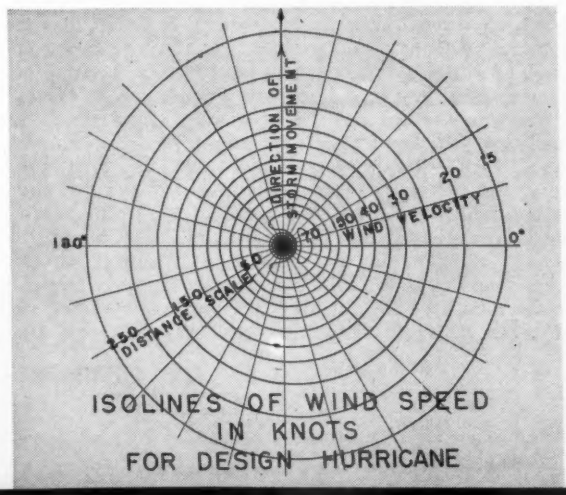
Galveston Hurricane - - 6000 to 7000 Died!



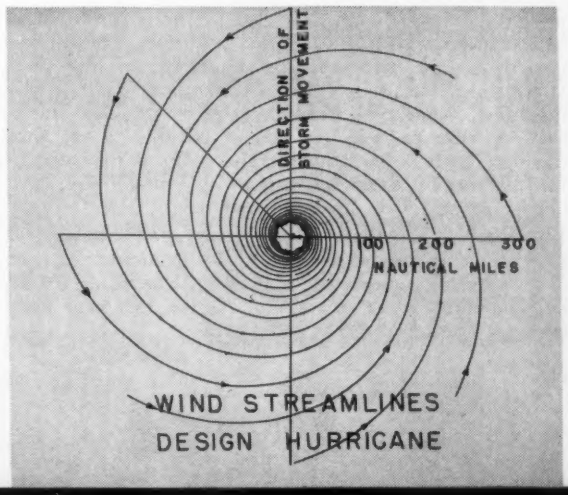
on occasions attain strengths as high as 50 to 60 knots.

Wind direction . . . In the main the winds prevailing over Gulf waters are from the east and south and are of light to moderate strength. In consequence the year-round incidence of wind waves at a typical deep-water offshore station (such as that located at latitude 28°, longitude 94°, about 90 nautical miles SSE of Galveston) is characterized by a preponderance of waves of low height (2-4 feet) and of about 5 to 6 secs dominant period, bearing most frequently from the south and south-east, as shown in Fig 1. Waves higher than about 12 feet are very infrequent and periods greater than 10 seconds are rarely encountered. The longer and higher waves would be the product of squall-lines and thunderstorms, developing over the Gulf in summer, and of northers in the winter months.

DISTRIBUTION OF WIND VELOCITY in a Typical (Design) Hurricane of 1-in100 Year Frequency. Fig. 3a.



STREAMLINES OF SURFACE AIR FLOW in the Same Hurricane. Fig. 3b.



Hurricanes!

Erupting into this rather placid picture on occasion are the fearsome hurricanes which spawn in the equatorial ocean and invade the Gulf or sometimes grow within its boundaries. Over the past 50 years an average of about 3 tropical storms per year have been active in the Gulf area although only about half of these have reached full hurricane proportions as now generally defined by a central pressure less than 29.00 ins. and wind velocities exceeding 75 mph.

Galveston Storm . . . The nature of these storms is portrayed by the sequence of synoptic maps showing the isobars of surface pressure for the severe hurricane of September 8-9, 1900, which destroyed Galveston and drowned 6000-7000 persons, Fig 2. The isobars are characteristically close-packed on the right hand side of the storm where the winds are highest. The distribution of wind velocity in a typical hurricane is indicated in Fig 3a and the spiralling circulation of the surface air in Fig 3b.

Hurricane Wave Height . . . In consequence of the forward progression of these storms at speeds of from 10 to 15 knots, the waves which are generated in the right rear-quadrant and travel in the same direction as the storm, remain under the domination of powerful winds for a great length of time. Thus they are able to develop in height the full functional effects of long fetch and prolonged duration. For the same deep-water offshore station near Galveston, corresponding to Fig 1, hurricane wave heights and periods, Fig 4, are found to be considerably greater.

As shown, there is the expectation that once in 100 years waves as high as 56 feet, and 18½ secs period will bear from SE to SSE.

Once in 5 years, 12½ sec waves of 32 feet height may be expected from ESE, or once in 20 years 16 sec waves of 44 feet height from the SE. Owing to the usual approach directions followed by hurricanes there is a comparatively narrow sector from which the most dangerous hurricane waves can arrive at a given offshore station. Fig 4 thus shows a sharp decline in magnitudes outside of the S-E quadrant.

It is not possible in this short space to give comparable information for other regions of the Gulf. Such information is available, however, and shows that the eastern boundaries of the Gulf are much less vulnerable to attack from high waves, as also are the south-western regions. The coastline from near Freeport, Texas, to the Mississippi delta, on the other hand, has much the same sort of susceptibility as that shown in Fig 4, though from differing directions.

The wave heights that have been quoted are *significant* wave heights, or the average of the highest one third of all waves reaching the offshore station in a representative time interval, say 20 mins. The quoted periods are the corresponding significant wave periods. It has been found that in any given sea condition the heights of waves tend to follow a fairly standard statistical distribution which makes it possible to say that the significant wave height is about 1.6 of the average for all the incident waves and the maximum wave height about 1.8 of the significant height.

It follows then that at the frequency of once-in-100 years there is the expectation of the occurence of rare deep water maximum waves of about 1.8x56, or 101-ft. height on the fringe of the continental shelf near Galveston.

It is fortunate indeed for the offshore operator that such formidable waves are considerably reduced in height by the time they reach water of a depth suitable for the erection of drilling platforms and working quarters. Several factors influence the heights of waves which roll on towards the coastlines; these are the direct shoaling effect, the refraction effect and the friction effect. To understand something of all this it is convenient to consider to what extent the properties of ocean waves are dependent on depth as indicated by simple wave theory.

The Airy Theory . . . The main elements of what we seek can be obtained by reference to the Airy theory for waves of small height. Despite this height restriction the theory is extremely versatile and often applies with good approximation to waves of quite large amplitude. According to this theory waves can be classified in three types:

(a) relatively-deep-water (short) waves whose wave length, λ, in relation to the water depth, d, is such that $d/\lambda > \frac{1}{2}$.

(b) relatively-shallow-water (long) waves for which $d/\lambda < \frac{1}{20}$.

(c) intermediate waves for which $\frac{1}{20} < \frac{d}{\lambda} < \frac{1}{2}$.

The characteristics of these wave types are depicted in Fig 5, wherein the shaded zone refers to waves of type (b), the narrow diagonal zone to waves of type (c) and the lower righthand zone to waves of type (a).

How to use Fig. 5 . . . To understand this diagram, consider, say, the nature of waves of 10 secs period in water of 10,000 feet depth. By following the 10 sec period line to the appropriate depth we find that $\lambda = 512$ feet and the wave velocity $c = 51.2$ ft./sec. These values of λ and c are maintained without change until the waves reach a depth of about 250 feet at which stage they effectively begin to feel bottom. Following along the period line to a depth of about 70 feet the following facts emerge: the wave length λ has decreased to about 400 ft, the wave velocity c to about 40 ft/sec. The diagonal line intersecting this point tells us that the ratio $d/\lambda = 0.17$ and that horizontal water-particle movements at the bottom are 61% of those at the surface, whereas in deep water they were quite negligible. The group velocity, V, of the waves, moreover, is 75% of c, or 30 ft/sec, this being the actual effective velocity of progression of the waves as a result of the interference of the numerous trains whose principal period is 10 seconds.

For 15 sec waves the deep water limit ($d/\lambda = \frac{1}{2}$) is about 600 feet (Fig 5) so that large hurricane waves begin to feel bottom at this depth. The influences of depth on wave height are not recorded in Fig 5. The shoaling effect is found to lead to a slight decrease of wave height as the waves progress through the zone of intermediate depths and then to an increase in height as the waves travel into the (shaded) zone of relatively shallow water, Fig 5. The refraction effect results from the divergence or convergence of wave energy as the waves seek a path over the bottom topography and adjust their wavelength and speed to the bottom contours. As shown in the wave refraction diagram, Fig 6, for the coastline in the vicinity of Freeport, Texas, there tends to be a slight convergence of wave energy at the mouth of the Brazos River and a divergence of energy northwards along the coast. Wave heights are

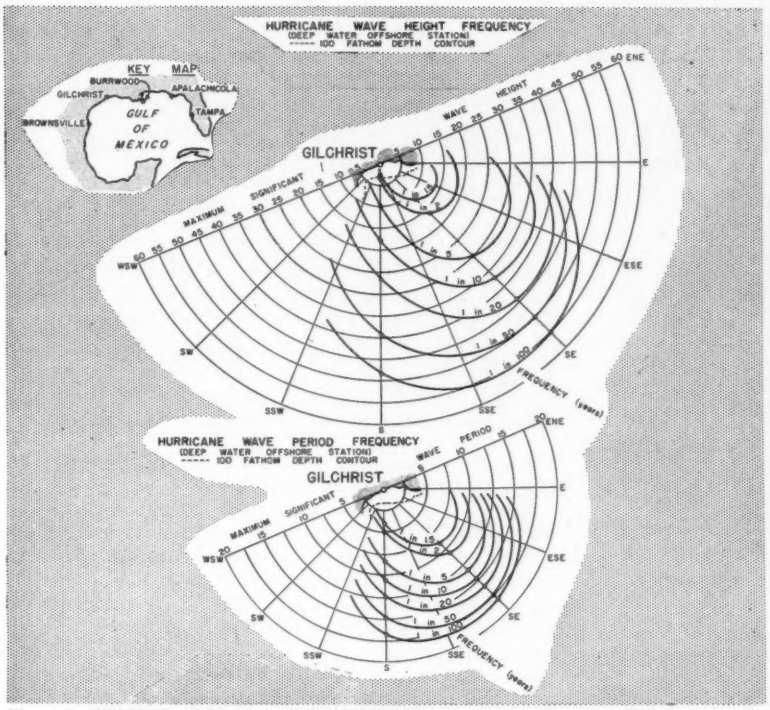
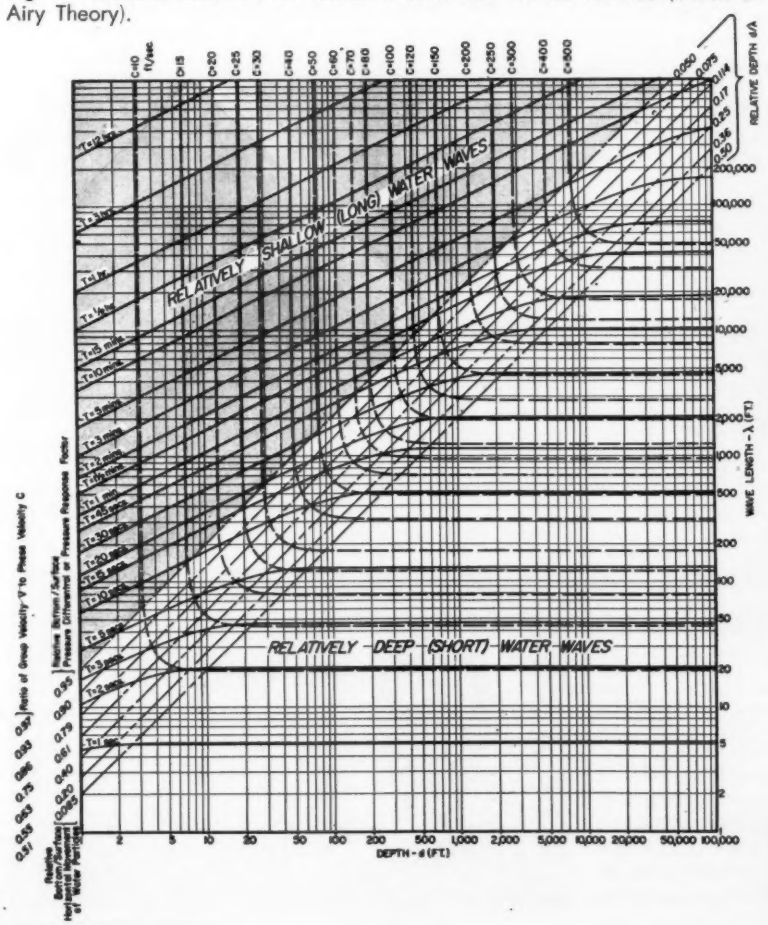
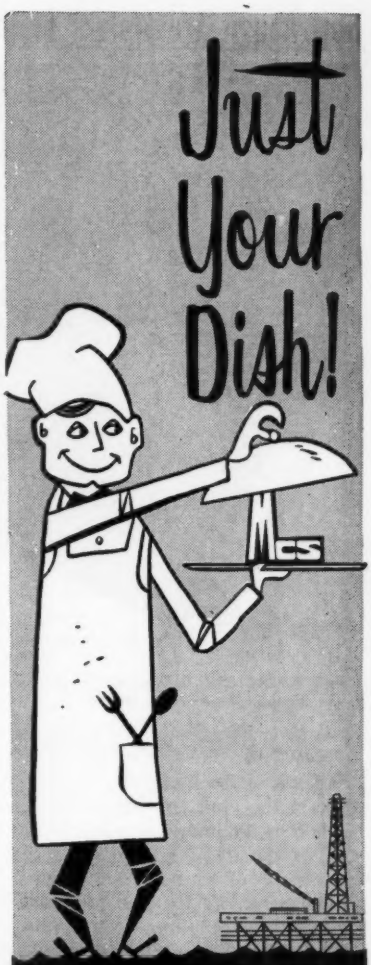


Fig. 4 FREQUENCIES OF OCCURRENCE of Hurricane Waves of Specific Heights and Periods at Deep-Water Offshore Station near Galveston (same location as Fig. 1).

Fig. 5 CHARACTERISTICS OF SMALL AMPLITUDE WATER WAVES (based on Airy Theory).





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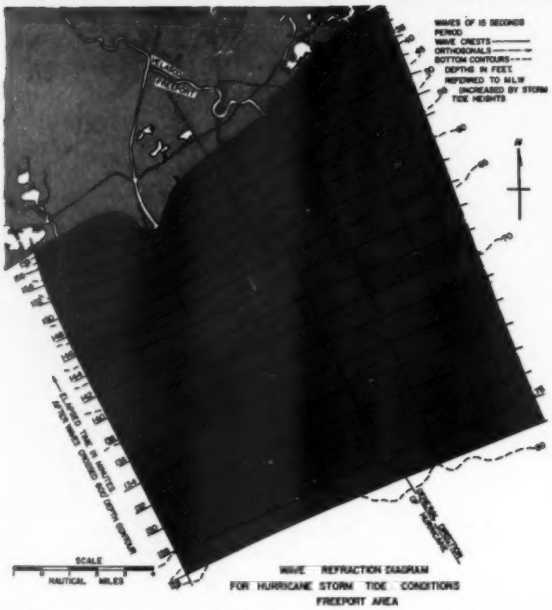

WAVE REFRACTION DIAGRAM for Hurricane Storm Tide Conditions in the Freeport Area, Texas. Fig. 6.

increased by convergence and decreased by divergence.

Effects of Shelf-slopes . . . For the shelf-slopes prevalent in the Gulf the friction effect has by far the most important influence on wave height and generally overwhelms the shoaling and refraction effects when these tend to produce increased heights. The joint effect of all these factors can be calculated with fair precision for any given location so that the most probable maximum wave in a given depth of water can be evaluated for design purposes. Thus a deep water significant wave height of 56 feet and 18 secs period for a hurricane of 1-in-100 year magnitude would probably be reduced to about 20 feet in water of about 45 feet depth. The likelihood is, however, that at this depth a wave of a shorter period in the spectrum, say about 12 secs, would emerge with a greater significant wave height, having suffered less from bottom friction than its 18 sec neighbor, initially more powerful in deep water. Such a 12 sec significant wave in 45-ft. water might have a height of about 27 feet and would statistically indicate breaking develop when the height exceeds about 0.78 of 48½-ft. height. However, since wave instability and breaking develop when the height exceds about 0.78 of the depth no maximum wave of such height could still exist even if the nominal water depth of 45 feet were increased by storm tide to 55 feet. In such circumstances the designing engineer would be justified in assuming that some wave, intermediate between the maximum and the significant wave, would break directly on his structure in the 55-ft. depth of water with a height of 0.78x55, or 43, feet.

Economics of Offshore Structures . . . The offshore operator must necessarily decide whether he can assume the risk of designing a less robust structure than that demanded by breaking waves to withstand the smaller waves of more frequent and less powerful hurricanes than one of the 1-in-100 year category. Actually there need be no risk attached if it can be shown that the site location is such as to inhibit the development of full breaking-waves even for 1-in-100 year storms.

How High Do Waves Get and Why

It's as simple as sucking on a soda straw; the low barometric pressure in the hurricane lifts the water. Add in the pile-up of water from the wind stresses and the effects of natural tides and it's easy to see why 15-ft. storm tides are not uncommon on the Gulf.

Great economies are possible if careful analyses can prove this point.

Storm Tides . . . A particularly dangerous feature of hurricanes is the storm tide raised by the dual effect of barometric suction on the sea surface and the stress of the wind in piling up water near the coast. The movement of the hurricane dynamically augments this rise in sea level above what could be attained by steady winds or stationary pressure. Storm tide super-elevations of as much as 15 feet have not been uncommon and have made tragic depredations upon the Gulf and east-coast seaboards. With the influx of additional waters the hurricane waves are permitted to penetrate and break over, and even beyond, the original shoreline with tremendous damaging effect.

Studies suggest that the highest waves conduct their ravages some two hours before the hurricane crosses the coastline by which time wave activity usually has declined somewhat. At this time, however, the arrival of the hurricane, in association with wind waves, which being lower penetrate further, may induce heads of water akin to bores whose attack can be devastating. Combined surge and breaking wave action churn up the sea bed and transport the soil inland with the flood, there depositing it, and then eroding the coastline yet more on the backwash. The battery of a single storm may in this way recess a coastline by as much as 150 feet over as many miles.

An example of this unleashed fury is Last Island. Lying 40 miles west of Grand Isle, Louisiana, it was once fairly well populated, and had beaches rivalling those of Pensacola today. Then in a single night on August 10, 1856, the island was razed clean of life and property and left a desolate waste.

Contribution from the Dept. of Oceanography and Meteorology, Agricultural and Mechanical College of Texas, Oceanography and Meteorology Series No. **124.**

BASIL W. WILSON began an engineering career in 1932 as a pupil engineer for the South African Railways and Harbours, Port Elizabeth Harbor.

He served the same firm until 1953 when he joined the staffs of Texas A & M College and Texas A & M Research Foundation.

Producer of Packaged Boilers Begins $2 Million Expansion

Cleaver-Brooks Company, Milwaukee, Wisconsin, has begun a $2 million expansion program.

Included in the program are a 70,000 sq. ft. addition to the firm's Lebanon, Pennsylvania, eastern manufacturing center and a new 25,000 sq. ft. production facility at Stratford, Ontario, Canada.

According to J. C. Cleaver, president, the Lebanon expansion will more than double the production space of the plant set up only two years ago. The addition, to cost about $1 million, is expected to be ready by December 1.

Other half of the program—the Stratford plant—involves an estimated capital outlay of about $900,000. The plant, to be erected on a 10 acre parcel of land within the city limits, is slated for occupancy late this year with initial production scheduled for early 1959.

Scott Appointed President By Drill Bit Manufacturer

Cecil C. Scott has been named president of Diamond Oil Well Drilling Company of Midland, Texas, manufacturer and distributor of diamond bits and coring equipment.

Scott

Prior to joining Dowdco as president and as a member of the board of directors, Scott was regional manager of Security Engineering Company in Dallas.

Scott became a salesman for Security in 1946 and was named regional manager in 1951.

BJ Tools Appoints Buckner Venezuelan Representative

J. Fred Buckner has been appointed sales representative in Venezuela by Byron Jackson Tools. Inc., a subsidiary of Borg-Warner Corporation.

Buckner will be located at the Maracaibo office of Oilfield Sales and Service, S.S., Venezuelan distributor for BJ oil tools. He will coordinate the stocking, sales and service of BJ oil tools and PB rubber products in the busy drilling areas of Venezuela and Colombia.

Before his transfer, Buckner held a similar position in BJ's Mexican operation. His Mexico City post will be filled by his former assistant, Enrique Inclan.

Reed Board Elects New Chairman and President

Board of Directors of Reed Roller Bit Company, Houston, Texas, recently elected a new chairman of the board, a new president, three new directors and announced the retirement of Rex G. Hamaker, director and president of the company.

Ray O. Shaffer, president of Welex, Inc., Fort Worth, Texas, was elected a director and will serve as

(continued on next page)

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Service Personalities . . .

(continued from preceding page)

chairman of the board of directors of the company. John F. Maher, formerly president of Oil Center Tool Company, Houston, was elected a director and new president of Reed Roller Bit Company.

A. H. Rowan, chairman of the board of directors of Rowan Drilling Company of Fort Worth, Texas, is the other new director elected.

Board members remaining on the board are John H. Blaffer, S. P. Farish, Claud B. Hamill, J. W. Link, Jr., John Mecom and Wharton Weems.

Briggs Filtration Names May Research-Development Chief

Clifford H. May has been appointed director of research and development for The Briggs Filtration Company, Washington, D.C.

May

May, a graduate of the University of Maryland in mechanical engineering, joined the Briggs Filtration Company in June, 1957.

He was formerly project engineer for the U. S. Engineer Corps at Fort Belvoir, Virginia, and prior to that filtration engineer for the pigments division of E. I. DuPont De Nemours & Company.

Stratton Appointed Manager Of New Dallas Aeroquip Plant

Clyde G. Stratton has been named manager of a new plant at Dallas, Texas, for Aeroquip Corporation.

Including offices, the new plant has 10,000 sq. ft. of floor space. Complete facilities will be available for assembly, proof test and inspection of hose assemblies.

Stratton, who joined Aeroquip in 1953, was formerly manager of the industrial warehouse which Aeroquip maintained in Dallas.

Schlumberger Announces Gulf Coast Appointments

Schlumberger Well Surveying Corporation has transferred G. H. Thomen from Corpus Christi to New Orleans as assistant to the area manager. He was location manager in Corpus Christi.

B. W. Alley has been named sales engineer at Gretna, Louisiana, and T. W. Cobb was appointed sales engineer in New Orleans.

NEW PRODUCTS and Literature

BJ Tools Develops Swabs With Faster Rate of Fall

New swabs which fall faster and automatically adjust to different loads have been developed by Byron Jackson Tools, Inc.

Featured are both cup-type rubbers and multi-disc type. A pair of either kind fits onto the streamlined two-piece body.

To minimize friction wear and to speed the drop to the bottom, the new swabs are designed to allow an annular clearance going down. When the swab is pulled, Venturi action pulls the rubbers outward against the tubing with just the right pressure to hold the load without leakage.

Through action of a special load compensating ring, the swab rubber automatically adjusts itself to any size load.

For further information, write Byron Jackson Tools, Inc., Los Angeles, California.

CATC Microwave Span Uses Aluminum Buildings

Wall sheets are held in tension to provide extra rigidity and strength in seven aluminum buildings recently built for use by the CATC Group microwave system off the coast of Louisiana.

Entire building is bolted together. Structures were designed so they could be picked up by the four eyebolts on the top corners after all microwave equipment had been installed.

For further information, write Lloyd T. Gibbs Company, 1021 Petroleum Building, Tulsa 3, Oklahoma.

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Tug ZEUS, 103' x 25' x 13'—1200 HP General Motors Diesel Gear Drive tug, built for Intracoastal Towing and Transportation Corp., Houston, Texas. Delivered August 13, 1957.

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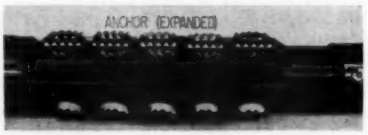
New wireline tool gives . . .

More Accuracy in Cementing

A new wireline cementing tool provides the oil operator with more accurate results in squeeze cementing operations for new wells and remedial operations.

Welex, Inc., of Fort Worth, which introduced the tool to field service, said it would make possible more predictable results in increasing displacement, preventing contamination, eliminating tool movement during the pressurizing cycle, obtaining a satisfactory packer seal under high pressure, retaining pressure for a prolonged period of time and equalizing pressures following the squeeze.



One of the principal operating features in the new tool is the utilization of rocket fuel propellant designed to burn at a retarded rate.

This moves more cement at a slower rate for less contamination, and the slow burning fuel creates larger quantities of gas at a higher temperature to move the increased amount of cement.

Another built-in innovation is a hydraulic hold-down anchor which holds the tool stationary while pressure is applied. The new anchor holds pressures in excess of 10,000 psi differential.

Built into the anchor is a release mechanism which will release without difficulty. Recovering the tool after a successful squeeze cementing job is almost as important as the squeeze job itself.

For further information, write Welex, Inc., P. O. Box 11336, Fort Worth, Texas.

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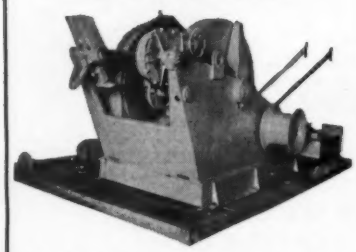

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Will the oil company or the person representing the company who went to Edwards, Mississippi last year trying to locate the Hall heirs please contact Mrs. Lulah A. Clark, 631 North President Street, Jackson, Mississippi.

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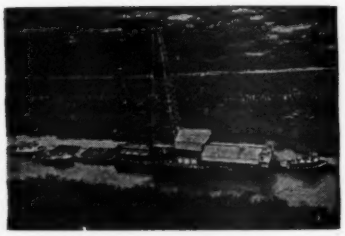

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Costly Acreage Proves Out

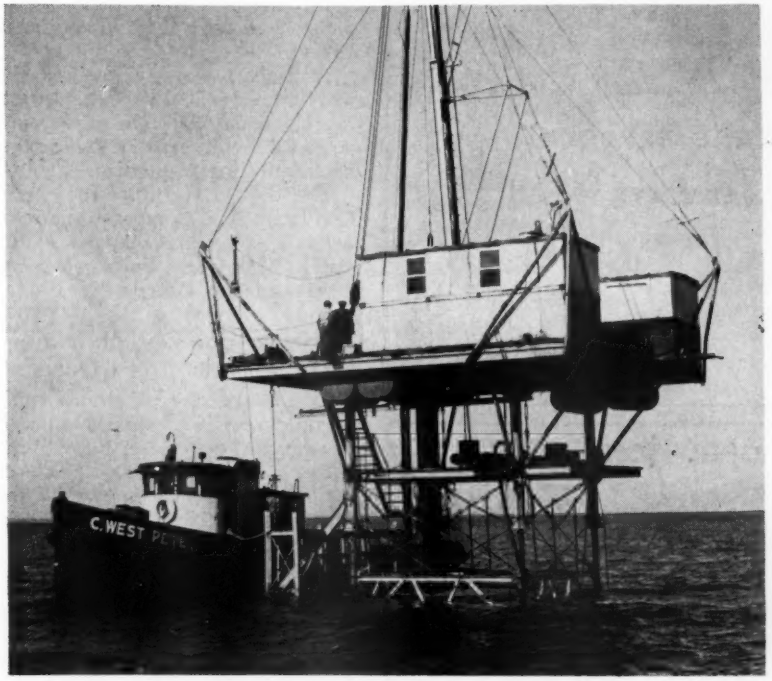
Mr. GUS II comes up with major oil discovery in 5000-acre block that cost CATC $9.4 million

A new oil discovery has been completed on one of the most expensive blocks ever leased in the Gulf of Mexico.

The 5000-acre block, designated Eugene Island 208, was leased by the CATC Group from the federal government for a bonus of $9.4 million.

Drilling in 96-ft. water, 42 mi. off the coast of Louisiana, Mr. Gus

(continued on next page)



Platforms such as this one owned by Underwater Gas Developers, Ltd. have brought in a large number of gas wells in Lake Erie in 1958. One of the best producing more than 2 million cubic ft. per day blew in recently on a Midcon Oil and Gas Company Limited lease off Kent County, Ontario. Drilled to a total depth of 1500 ft. in 48-ft. waters by Acqua-Land Tower No. 1, the well is Midcon's third gas completion in six attempts in the lake. Drilling operations on the lease will continue until ice floes form in November.

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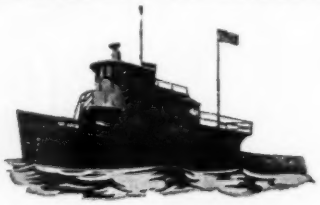

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Exploration . . .

(Continued from preceding page)

II, C. G. Glasscock's mammoth mobile unit, finaled the test at 9612 ft.

On a four-hour test, the strike flowed 269 bbls. of 37.3-degree gravity oil and 250,000 CFGD on an 8/64-in. choke. It was drilled to a total depth of 9612 ft. and perforated at the interval of 8879 to 8885 ft. Gas-oil ratio was 929-1. Nearest production is more than five mi. northeast.

Mr. Gus II, which holds the deep water drilling record for a mobile unit—a triple oil completion drilled in 137-ft. water last winter—almost set a new drilling record in its latest effort.

In the early stages of the well, the mobile unit drilled 2050 ft. of hole in a single day. It is one of the most powerful rigs in existence with 6000 hp for drilling equipment.

The CATC Group consists of Continental Oil Company, operator, Atlantic Refining Company, Tidewater Oil Company and Cities Service Production Company.

Tidewater Has One of Texas' First Overwater Triple Oilers

One of the first overwater triple oil producers in Texas was opened recently in Galveston Bay.

The well, first triple oil producer for Tidewater Oil Company, is the State Lease 74 No. 1, a development in the Umbrella Point Field.

It is Tidewater's second well in the Umbrella Point Field. First completion was a dual producer in State Tract 87, below the present location.

On three hour tests the upper pay zone at 7697 to 7703 ft. produced 233 bbls. of oil per day on a 9/64-in. choke.

Second zone downhole made 252 bbls. of oil daily from perforations between 8269 to 8274 ft. on a 10/64-in. choke. Flow from the deepest zone tested 280 bbls. per day on a 16/64-in. choke. Perforations were at 9076 to 9078 ft.

New Persian Gulf Wildcat Flows 2400 Bbls. Per Day

First well drilled on a 12,000-sq. mi. lease in the Persian Gulf by Abu Dhabi Marine Areas Limited has flowed oil for a limited period at the rate of 2400 bbls. per day.

Production was from the lower cretaceous Shuaiba limestone, which is still being tested. Oil produced was of 40 degrees A.P.I. gravity with a sulphur content of 1.4 percent.

OFFSHORE LOCATIONS

LOUISIANA

Cameron Parish

Mecom Petroleums 7 (OCS-0300), State Lease 1134, West Cameron Block 45. Block 45, West Cameron Area. Proposed Depth 13,000 feet.

Shell Oil Co. A-9 (OCS-0406), West Cameron Block 192. Block 82, West Cameron Area. Proposed Depth 10,400 feet.

Lafourche Parish

Block 27 Associates, Ltd. A-2 (OCS-0226), State Lease 1425, South Timbalier Block 27, Wildcat. Block 27, South Timbalier Area. Proposed Depth 12,000 feet.

The California Co. 29 State Lease 1365, Bay Marchand Block 2. Block 1, Bay Marchand Area. Proposed Depth 8,850 feet.

T-8 State Lease 1365, Bay Marchand Block 2. Block 2, Bay Marchand Area. Proposed Depth not given.

4 (OCS-0390), State Lease 932, Bay Marchand Block 2. Block 26, Grand Isle Area. Proposed Depth 8700 feet.

3 (OCS-0599), South Timbalier Block 86. Block 63, South Timbalier Area. Proposed Depth 12,000 feet.

Gulf Oil Corp. 3 (OCS-0264), State Lease 1548, South Timbalier Block 20. Block 20, South Timbalier Area. Proposed Depth 12,000 feet.

4 (OCS-0263), State Lease 1423, South Timbalier Block 21. Block 21, South Timbalier Area. Proposed Depth 10,700 feet.

Humble Oil & Refining Co. E-1 (OCS-0421), South Timbalier Block 54. Block 55, South Timbalier Area. Proposed Depth 12,000 feet.

Plaquemines Parish

The California Co. I-5 (OCS-0371), State Lease 1277, Main Pass Block 68. Block 68, Main Pass Area. Proposed Depth 7150 feet.

28 State Lease 2485, South Pass Block 24. Block 24, South Pass Area. Proposed Depth 8800 feet.

11 State Lease 1922, West Delta Block 83. Block 83, West Delta Area. Proposed Depth 10,000 feet.

Continental Oil Co. C-10 (OCS-0138), State Lease 970, West Delta Block 30. Block 45, West Delta Area. Proposed Depth 9900 feet.

E-7 (OCS-0138), State Lease 970, West Delta Block 30. Block 45, West Delta Area. Proposed Depth 9800 feet.

22 State Lease 978, West Delta Block 83. Block 53, West Delta Area. Proposed Depth 10,300 feet.

Gulf Oil Corp. 1 State Lease 2716, South Pass Block 20. Block 21, South Pass Area. Proposed Depth 9600 feet.

35 State Lease "PP" 192, West Bay. From USC&GS Station "West 1927" go N 14 deg 42 min 12 sec W 4789.5'. Proposed Depth 11,000 feet.

Hassie Hunt Trusts et al D-20 State Lease 2484, South Pass Block 24. Block 24, South Pass Area. Proposed Depth 9800 feet.

Magnolia Petroleum Co. 1 State Lease 2726, Main Pass Block 69. Block 46, Main Pass Area. Proposed Depth 9000 feet.

Shell Oil Co. 38 (OCS-0353), State Lease 1012, South Pass Block 27. Block 28, South Pass Area. Proposed Depth 10,500 feet.

39 (OCS-0353), State Lease 1012, South Pass Block 27. Block 28, South Pass Area. Proposed Depth 10,300 feet.

40 (OCS-0353), State Lease 1012, South Pass Block 27. Block 28, South Pass Area. Proposed Depth 9000 feet.

41 (OCS-0353), State Lease 1012, South Pass Block 27. Block 28, South Pass Area. Proposed Depth 8200 feet.

44 (OCS-0353), State Lease 1012, South Pass Block 27. Block 28, South Pass Area. Proposed Depth 7400 feet.

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47 (OCS-0353), State Lease 1012, South Pass Block 27. Block 28, South Pass Area. Proposed Depth 9100 feet.

St. Mary Parish

Continental Oil Co. 1 (OCS-0577), Eugene Island Block 208, Wildcat. Block 208, Eugene Island Area. Proposed Depth not given.

Placid Oil Co. 2 (OCS-0475), Eugene Island Block 128. Block 117, Eugene Island Area. Miocene.

1 (OCS-0437), Eugene Island Block 199, Wildcat. Block 199, Eugene Island Area. Miocene.

Shell Oil Co. A-4 (OCS-0443), Eugene Island Block 188. Block 188, Eugene Island Area. Proposed Depth 12,800 feet.

Sinclair Oil & Gas Corp. 1 (OCS-0439), Eugene Island Block 188. Block 190, Eugene Island Area. Proposed Depth 12,500 feet.

Terrebonne Parrish

Union Oil of California-LL&E 17 State Lease 2826, Caillou Island. From USC&GS Station "King 2" go N 70 deg 30 min 38 sec E 11,022.2'. Proposed Depth 12,000 feet.

Vermilion Parish

Superior Oil Co. B-2 (OCS-0249), State Lease 1106, Vermilion Block 76. Block 76, Vermilion Area. Proposed Depth 9400 feet.

Union Oil of California B-1 (OCS-0560), Vermilion Block 76. Block 67, Vermilion Area. Proposed Depth 9700 feet.

OFFSHORE COMPLETIONS

TEXAS

Jefferson County

Hunt Oil Co. 1 State Tract 20-S, Wildcat. Oil. Total Depth 9915 feet. Perfs 7189-93 feet. PT 150 BOPD on ⅛-inch choke. TP 1000 pounds. Grav. 32, GOR not given. State Tract 20-S, Gulf of Mexico. Contractor, Penrod Drilling Co.

LOUISIANA

Cameron Parish

Magnolia Petroleum Co. A-6 (OCS-089), State Lease 1202, East Cameron Block 64. Dual Gas. Total Depth 11,400 feet. Perfs 11,254-272 feet. PT 162 BOPD and 6,047,000 CFGPD on 14/64-inch choke. TP 5200 pounds. Grav. 47.3, GLR 37,325-1. Perfs 10,594-612 feet. PT 170 BOPD and 5,969,000 CFGPD on 15/64-inch choke. TP 4500 pounds. Grav. 52.7, GLR 35,112-1. Block 64, East Cameron Area.

Mecom Petroleums 6 (OCS-0300), State Lease 1134, West Cameron Block 45. Oil. Total Depth 10,237 feet. Perfs 10,005-024 feet. PT 232 BOPD and 143,000 CFGPD on 16/64-inch choke. TP 1500 pounds. Grav. 41, GOR 618-1. Block 45, West Cameron Area.

Natural Gas & Oil Co. 4 State Lease 1172, East Cameron Block 4. Dual Gas. Total Depth 13,375 feet. Perfs 12,814-840 feet. PT 207 BDPD and 4,700,000 CFGPD on 14/64-inch choke. TP 3800 pounds. Grav. 44, GLR 22,750-1. Perfs 11,755-763 feet. PT 78 BDPD and 3,710,000 CFGPD on 4/64-inch choke. TP 3350 pounds. Grav. 44.8, GLR 47,550-1. Block 9, East Cameron Area. Contractor, Ocean Drilling & Exploration Co.

Shell Oil Co. 1 (OCS-0447), East Cameron Block 115, Wildcat. Dry. Total Depth 380 feet. Block 115, East Cameron Area. Contractor, McClelland Engineers.

A-5 (OCS-0406), West Cameron Block 192. Temporarily Abandoned. Total Depth 9800 feet. Block 82, East Cameron Area.

Superior Oil Co. B-6 (OCS-0244), State Lease 786, West Cameron Block 71. Temporarily Abandoned. Total Depth 12,530 feet. Block 71, West Cameron Area.

Iberia Parish

The Texas Co. 1 (OCS-0310), State Lease 340-S, Marsh Island, Wildcat. Gas. Total Depth 12,866 feet. Perfs 8506-16 feet. PT, TP, Grav., GLR not given. From USC&GS Station "La Croix-1933" go S 14 deg 49 min 19 sec E 31,827'.

1 (OCS-0310), State Lease 340-SW, Marsh Island, Wildcat. Dry. Total Depth 12,395 feet. From USC&GS Station "Channell-1933" go S 17 deg 10 min 34 sec W 50,990'.

Jefferson Parish

Humble Oil & Refining Co. P-3 (OCS-031), State Lease 803, Grand Isle Block 16. Abandoned Location. Total Depth not given. Block 22, Grand Isle Area.

J-15 (OCS-031), State Lease 803, Grand Isle Block 16. Dual Oil. Total Depth 8582 feet. Perfs 8516-21 feet. PT 171 BOPD on ⅛-inch choke. TP 1240 pounds. Grav. 33.3, GOR 777-1. Perfs 8015-20 feet. PT 166 BOPD on ⅛-inch choke. TP 1700 pounds. Grav. 36.4, GOR 1315-1. Block 23, Grand Isle Area.

Lafourche Parish

Block 27 Associates, Ltd. A-1 (OCS-0226), State Lease 1425, South Timbalier Block 27, Wildcat. Dry. Total Depth 16,244 feet. Block 27, South Timbalier Area. Contractor, Coastal Marine Drilling & Construction Co.

The California Co. 28 State Lease 1365, Bay Marchand Block 2. Oil. Total Depth 8824 feet. Perfs 8706-36 feet. PT 384 BOPD and 293,000 CFGPD on 10/64-inch choke. TP 1375 pounds. Grav. 26.4, GOR 764-1. Block 1, Bay Marchand Area.

T-6 State Lease 1365, Bay Marchand Block 2. Oil. Total Depth 8091 feet. Perfs 7696-7730 feet. PT 228 BOPD and 72,000 CFGPD on 10/64-inch choke. TP 1000 pounds. Grav. 23.9, GOR 316-1. Block 1, Bay Marchand Area. Contractor, Noble Drilling Co.

3 (OCS-0390), State Lease 932, Bay Marchand Block 2. Oil. Total Depth 11,030 feet. Perfs 10,116-144 feet. PT 243 BOPD and 430,000 CFGPD on 7/64-inch choke. TP 3800 pounds. Grav. 39.3, GOR 1770-1. Block 26, Bay Marchand Area.

Gulf Oil Corp. 2 (OCS-0263), State Lease 1423, South Timbalier Block 21. Triple Oil. Total Depth 11,300 feet. Perfs 11,142-154 feet. PT 310 BOPD and 890,000 CFGPD on 8/64-inch choke. TP 4850 pounds. Grav. 29.2, GOR 2870-1. Perfs 10,292-302 feet. PT 374 BOPD and 298,000 CFGPD on 10/64-inch choke. TP 1910 pounds. Grav. 31.6, GOR 796-1. Perfs 10,206-214 feet. PT 383 BOPD and 297,000 CFGPD on 10/64-inch choke. TP 2000 pounds, Grav. 31.7, GOR 775-1. Block 21, South Timbalier Area. Contractor, Dixilyn Drilling Corp.

Sinclair Oil & Gas Corp. A-5 (OCS-0605), South Timbalier Block 86. Oil. Total Depth 12,800 feet. Perfs 12,673-683 feet. PT 279 BOPD and 238,000 CFGPD on 10/64-inch choke. TP 1700 pounds. Grav. 33.6, GOR 853-1. Block 86, South Timbalier Area. Contractor, Rimrock-Tidelands, Inc.

Plaquemines Parish

The California Co. 1 G. T. Armstrong 4 et al Un 7, South Pass Block 24. Oil. Total Depth 9100 feet. Perfs. 8428-40 feet. PT 198 BOPD on 9/64-inch choke. TP not given. Grav. 35, GOR 659-1. Block 24, South Pass Area.

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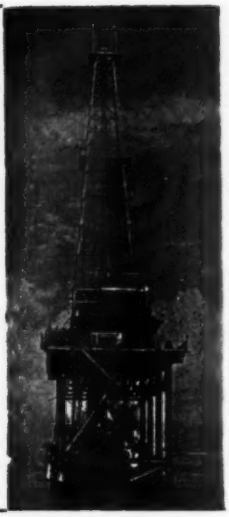

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1 H. B. Howcott, et al, South Pass Block 24. Oil. Total Depth 9000 feet. Perfs 8349-59 feet. PT 357 BOPD on 11/64-inch choke. TP 1260 pounds. Grav. 34, GOR 655-1. Block 24, South Pass Area.

2 H. B. Howcott, et al Un 2, South Pass Block 24. Oil. Total Depth 8700 feet. Perfs 8493-8510 feet. PT 312 BOPD and 237,000 CFGPD on 10/64-inch choke. TP 1375 pounds. Grav. 32.6, GOR 760-1. Block 24, South Pass Area.

F-9 (OCS-0385), State Lease 1069, West Delta Block 30. Oil. Total Depth 7762 feet. Perfs 7200-31 feet. PT 168 BOPD and 203,000 CFGPD on 8/64-inch choke. TP 1150 pounds. Grav. 31. GOR not given. Block 29, West Delta Area.

F-10 (OCS-0385), State Lease 1069, West Delta Block 30. Oil. Total Depth 7810 feet. Perfs 7476-88 feet. PT 194 BOPD on 9/64-inch choke. TP 1000 pounds. Grav. 34.8, GOR 547-1. Block 29, West Delta Area.

G-3 (OCS-0385), State Lease 1069, West Delta Block 30. Oil. Total Depth 11,412 feet. Perfs 10,173-212 feet. PT 263 BOPD and 217,000 CFGPD on 9/64-inch choke. TP 1600 pounds. Grav. 31, GOR 1480-1. Block 29, West Delta Area.

1 State Lease 1922, et al Un 6, West Delta Block 83. Oil. Total Depth 10,365 feet. Perfs 10,077-089 feet. PT 303 BOPD on 9/64-inch choke. TP 2140 pounds. Grav. 34, GOR 888-1. Block 83, West Delta Area.

1 State Lease 1922, et al Un 8, West Delta Block 83. Oil. Total Depth 10,511 feet. Perfs 10,400-417 feet. PT 300 BOPD and 246,000 CFGPD on 9/64-inch choke. TP 2000 pounds. Grav. 35, GOR 785-1. Block 83, West Delta Area.

1 State Lease 1922 et al Un 7, West Delta Block 83. Oil. Total Depth 10,365 feet. Perfs 10,077-089 feet. PT 303 BOPD on 19/128-inch choke. TP 2040 pounds. Grav. 34.5, GOR 353-1. Block 83, West Delta Area.

Continental Oil Co. E-6 (OCS-0138), State Lease 970, West Delta Block 30. Dual Oil. Total Depth 11,178 feet. Perfs 9091-96 feet. PT 287 BOPD and 115,000 CFGPD on 9/64-inch choke. TP 1500 pounds. Grav. 27.6, GOR 401-1. Perfs 6517-22 feet. PT 108 BOPD and 23,000 CFGPD on 9/64-inch choke. TP 500 pounds. Grav. 27, GOR 215-1. Block 45, West Delta Area. Contractor, Nicklos Drilling Co.

21 State Lease 978, West Delta Block 83. Oil. Total Depth 10,304 feet. Perfs 10,096-106 feet. PT 232 BOPD and 166,000 CFGPD on 8/64-inch choke. TP 2050 pounds. Grav. 34.8, GOR 717-1. Block 53, West Delta Area. Contractor, Sharp-Gulf Drilling Co.

Hassie Hunt Trusts, et al 1 State Lease 2484 Un 6, South Pass Block 24. Dual Oil. Total Depth 8910 feet. Perfs 8730-44 feet. PT 211 BOPD on 12/64-inch choke. TP 750 pounds. Grav. 32.4, GOR 928-1. Perfs 8187-8204 feet. PT 137 BOPD and 450,000 CFGPD on 9/64-inch choke. TP 2100 pounds. Grav. 32, GOR 4500-1. Block 24, South Pass Area. Contractor, Penrod Drilling Co.

18 State Lease 2484, South Pass Block 24. Oil. Total Depth 9000 feet. Perfs 8430-38 feet. Pt 168 BOPD on 8/64-inch choke. TP 1500 pounds. Grav. 37.7, GOR 400-1. Block 24, South Pass Area. Contractor, Penrod Drilling Co.

2 St-Harvey "C" Tr 2, South Pass Block 24. Dry. Total Depth 8903 feet. Block 24, South Pass Area. Contractor, Penrod Drilling Co.

3 St-Harvey "C" Tr 1, South Pass Block 24. Dual Oil-Gas. Total Depth 9030 feet. Perfs 8624-29 feet. PT 87 BOPD on 9/64-inch choke. TP 750 pounds. Grav. 32.2, GOR 633-1. Perfs 8174-82 feet. PT 12 BOPD and 1,050,-000 CFGPD on 10/64-inch choke. TP 2750 pounds. Grav. 56.2, GLR 87,500-1. Block 24, South Pass Area.

4 St-Harvey "C" Tr 1, South Pass Block 24. Dual Oil-Gas. Total Depth 9042 feet. Perfs 8796-8800 feet. PT 260 BOPD on 9/64-inch choke. TP 1800 pounds. Grav.

not given. GOR 1015-1. Perfs 8182-92 feet. PT 35 BOPD and 975,000 CFGPD on 10/64-inch choke. TP 2550 pounds. Grav. 49.6, GLR 27,860-1. Block 24, South Pass Area. Contractor, Penrod Drilling Co.

Humble Oil & Refining Co. P-3 (OCS-026), State Lease 819, West Delta Block 30. Location Abandoned. Total Depth not given. Block 30, West Delta Area.

R-1 (OCS-016), State Lease 820, West Delta Block 30. Location Abandoned. Total Depth not given. Block 31, West Delta Area.

Shell Oil Co. 1 State Lease 2555, Main Pass Block 69. Dry. Total Depth 9182 feet. Block 69, Main Pass Area.

1 State Lease 2558, Main Pass Block 69, Wildcat. Dry. Total Depth 7230 feet. Block 69, Main Pass Area.

68 State Lease 998, South Pass Block 24. Oil. Total Depth 8012 feet. Perfs 7852-62 feet and 7867-77 feet. PT 176 BOPD and 78,000 CFGPD on 8/64-inch choke. TP 890 pounds. Grav. 26, GOR 435-1. Block 11, South Pass Area.

71 State Lease 998, South Pass Block 24. Oil. Total Depth 8010 feet. Perfs 7828-34 feet. PT 160 BOPD and 98,000 CFGPD on 9/64-inch choke. TP 600 pounds. Grav. 31.4, GOR 315-1. Block 11, South Pass Area.

B-37, State Lease 1388, South Pass Block 24. Oil. Total Depth 8036 feet. Perfs 7832-47 feet. PT 120 BOPD on 7/64-inch choke. TP 940 pounds. Grav. 34, GOR 517-1. Block 24, South Pass Area.

B-29 (OCS-0349), State Lease 1007, South Pass Block 27. Oil. Total Depth 11,333 feet, Perfs 8300-12 feet. PT 154 BOPD and 160,000 CFGPD on 9/64-inch choke. TP 1300 pounds. Grav. 35.6, GOR 1039-1. Block 23, South Pass Area.

26 (OCS-0353), State Lease 1012, South Pass Block 27. Oil. Total Depth 10,249 feet. Perfs 8864-67 feet and 8869-84 feet. PT 107 BOPD and 168,000 CFGPD on 10/64-inch choke. TP 825 pounds. Grav. 35.4, GOR 1570-1. Block 28, South Pass Area.

32 (OCS-0353), State Lease 1012, South Pass Block 27. Oil. Total Depth 8200 feet. Perfs 7808-26 feet. PT 199 BOPD and 45,000 CFGPD on 9/64-inch choke. TP 600 pounds. Grav. 22.6, GOR 226-1. Block 28, South Pass Area.

33 (OCS-0353), State Lease 1012, South Pass Block 27. Oil. Total Depth 7217 feet. Perfs 7189-7211 feet. PT 129 BOPD on 9/64-inch choke. TP 850 pounds. Grav. 29, GOR 643-1. Block 28, South Pass Area.

36 (OCS-0353), State Lease 1012, South Pass Block 27. Oil. Total Depth 7364 feet. Perfs 7200-23 feet. PT 168 BOPD and 32,000 CFGPD on 10/64-inch choke. TP 500 pounds. Grav. 26.9, GOR 214-1. Block 28, South Pass Area.

St. Mary Parish

Placid Oil Co. 2 (OCS-0477), Eugene Island Block 188. Dry. Total Depth 13,520 feet. Block 120, Eugene Island Area. Contractor, Penrod Drilling Co.

Shell Oil Co. 1-S (OCS-0450), Eugene Island Block 175. Dry. Total Depth 245 feet. Block 175, Eugene Island Area. Contractor, McClelland Engineers.

Sinclair Oil & Gas Co. B-3 (OCS-0438), Eugene Island Block 175. Gas. Total Depth 10,002 feet. Perfs 9691-9728 feet. PT 33 BDPD and 2,377,000 CFGPD on 16/64-inch choke. TP 2900 pounds. Grav. 48.7, GLR 72,030-1. Block 175, Eugene Island Area. Contractor, Rimrock-Tidelands, Inc.

Terrebonne Parish

Magnolia Petroleum Co. H-1 (OCS-060), State Lease 766, Ship Shoal Block 73. Oil. Total Depth 11,421 feet. Perfs 6855-61 feet. PT 460.32 BOPD and 288,000 CFGPD on 12/64-inch choke. TP 1125 pounds. Grav. 39.9, GOR 625-1. Block 72, Ship Shoal Area.

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"And remember, friends, there will be no selling and buying in heaven."

That's when a drilling contractor on the back row got up and said, "Well, that's not where business has gone anyway."

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"Why, he made eight correct predictions out of ten and they thought he must be depending on a patent medicine almanac."

Voice on phone to hotel clerk: "Send some pepper up to my room please."

Clerk: "Pepper! Do you realize it's 2:30 in the morning? The dining room is closed, and there's no place to get pepper. By the way, what in the world do you want with pepper at this hour?"

Voice: "Vot does anybody vant with toilet pepper at 2:30 in the a. m.?"

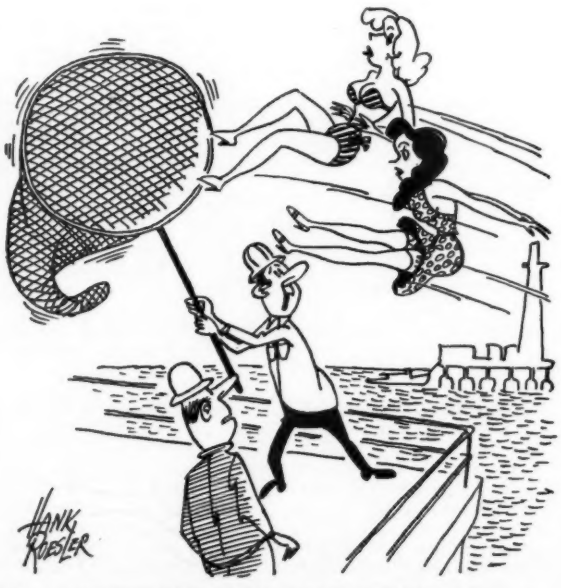
Rooster: "I get awfully tired of chicken all the time."

The soldier was on leave for his honeymoon. On the eve of the 10th day he wired his commanding officer: "It's wonderful here, requesting 10 days extension of leave."

The officer wired back: "It's wonderful anywhere—return at once."

Two old maids were returning home after an evening of bridge. On the way one of them noticed two soldiers walking on the opposite side of the street. As it was quite late, she said, "Do you suppose those boys are out after hours?"

The other replied, "Goodness, I don't know, but I hope so."



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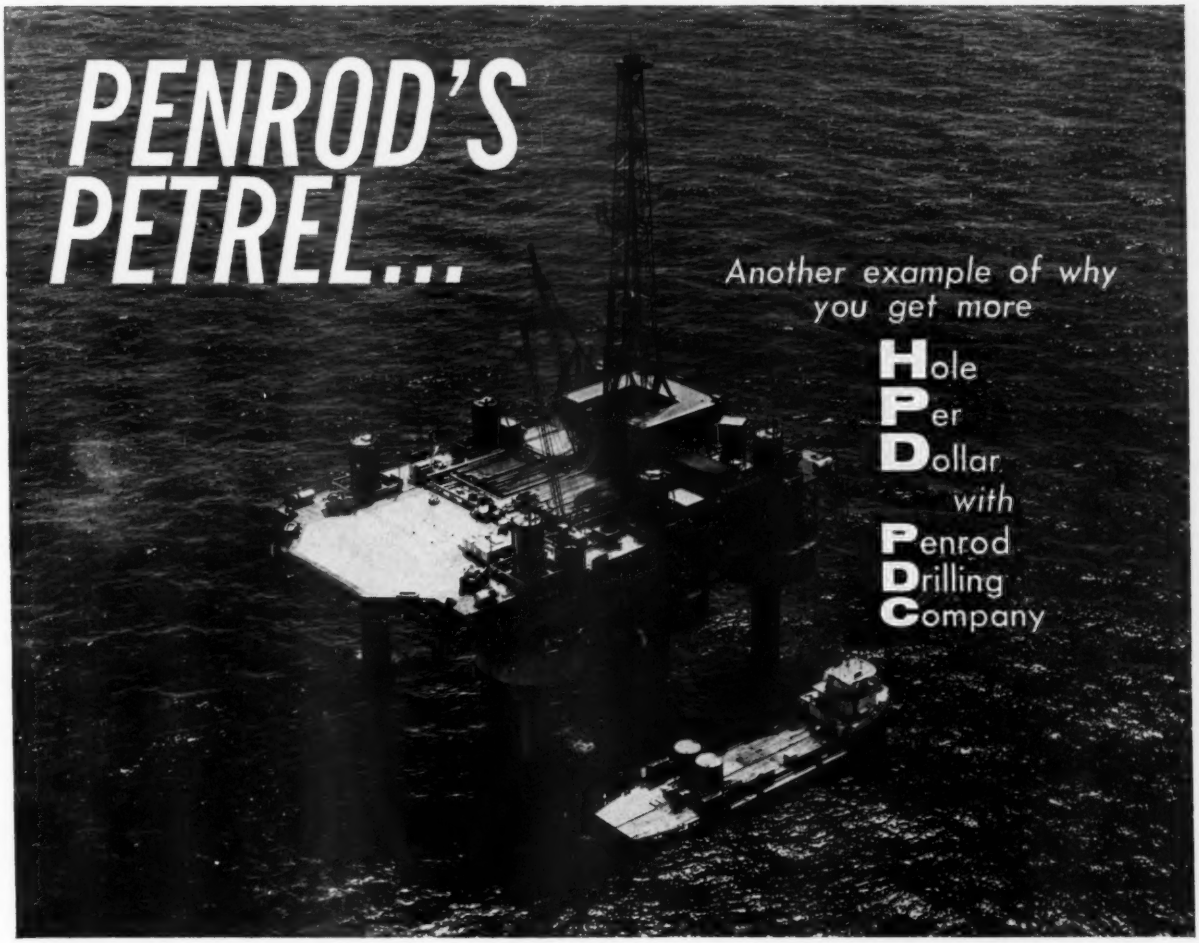

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